MEDICAL LIBRARY 1949 v. 2 JUL 18 1949

BRITISH MEDICAL JOURNAL

JOURNAL OF THE BRITISH MEDICAL ASSOCIATION

SATURDAY JULY 2 1949

TABLE OF CONTENTS

Man and the Machine C. W. CURTIS BAIN, M.C., D.M., F.R.C.P. 1

Tuberculous Empyema D. A. ANDERSEN, M.D., F.R.C.S. 6

Penicillin in the Treatment of Influenzal Meningitis FRANCES BRAID, M.D., F.R.C.P., and RICHARD B. MEYER, M.B., M.R.C.P. 11

Study of Post-war Incidence of Breast-feeding F. H. M. DUNCAN, M.B., D.P.H. 14

Aschheim-Zondek and Hogben Pregnancy Tests Modified and Compared F. W. LANDGREBE, D.Sc., and B. M. HOBSON, B.Sc. 17

Simple Weight-reducing Diet H. L. MARRIOTT, C.B.E., M.D., F.R.C.P. 18

MEDICAL MEMORANDA

Pylorospasm in the Adult, Complicated by Uraemia. E. N. RUSSELL, M.D., B.Ch. 18

Sternal Swelling as a Presenting Sign of Hodgkin's Disease. J. S. GEMMILL, M.B., D.P.H. 19

GENERAL ARTICLES AND NEWS

SURGEONS HONOUR LORD NUFFIELD 27

CENTRE FOR INTERNATIONAL CO-OPERATION IN LONDON 27

PHYSIOLOGICAL RESEARCH AND VIVISECTION 28

HOMES FOR AGED AND SICK 28

THE FAMILY PLANNING ASSOCIATION 29

B.C.G. VACCINATION 29

STAFF COLLEGE FOR WARD SISTERS 30

UNIVERSITIES AND COLLEGES 35

MEDICAL NOTES IN PARLIAMENT 35

MEDICAL NEWS 37

BIRTHS, MARRIAGES, AND DEATHS 38

REVIEWS

The Nose and Throat 20

Laboratory Animals 20

Books Received 21

Epidemiology Section 36

LEADING ARTICLES

The General and the Special 22

Tuberculous Empyema 23

Cortisone in the Treatment of Rheumatism 24

ANNOTATIONS

Drug-resistant Trypanosomes 25

Laboratory Animals 26

QUESTIONS AND COMMENTS

Dicoumarol and Prothrombin Level—Hypoglycaemia and Cerebral Lesions—Bacteriology of the Throat—Anaphylaxis to A.T.S.—Distribution of Pain in Coronary Occlusion—Chronic Diarrhoea—Anaerobic Streptococci from Uterus—Ergotamine and Pregnancy—Sydenham's Chorea—Temperature at Ovulation—Post-gastrectomy Diet—Vaccine Lymph—Pediculosis Pubis—Pruritus 38

SUPPLEMENT

Annual Representative Meeting, Harrogate, 1949 1

ANNUAL GENERAL MEETING 27

EXTRAORDINARY GENERAL MEETING 27

LUNCHEON TO OVERSEAS REPRESENTATIVES 28

SUPPLEMENTARY OPHTHALMIC SERVICE 28

CORRESPONDENCE 28

ASSOCIATION NOTICES 30

CORRESPONDENCE

Medicine in the United States. S. L. SIMPSON, M.D. 30

Tuberculosis in Industry. S. ROOKSBOURN GLOYNE, M.D. 31

Resectable Carcinoma of the Stomach. W. L. HARNETT, F.R.C.S. 31

Abortions and Psychoneurosis. ALICK BOURNE, F.R.C.S.; PAUL R. SAVILLE, M.R.C.S. 31

Treatment of Hepatic Cirrhosis. JAMES S. ROBSON, M.D. 32

Infective Hepatitis and Portal Cirrhosis. K. DAMODARAN, M.B. 32

Dried Plasma for Domiciliary Midwifery. REX RINNERD, M.R.C.S.; R. P. ROBERTSON, M.B. 32

An Unfortunate Precedent. M. WALKER, M.D. 33

Transfusion Compatibility Tests. M. S. ROSS, M.R.C.S.; B. GODWIN, M.R.C.S., and A. J. MCCALL, M.D. 33

Prognosis in Hysteria. S. BARTON HALL, M.D. 33

Points from Letters 33

OBITUARY

Sir Thomas Houston, C.B.E., M.D. 34

J. F. O'Malley, F.R.C.S. 34

W. A. Blomfield, F.R.C.S.Ed. 34

BRITISH MEDICAL ASSOCIATION, TAVISTOCK SQUARE, LONDON, W.C.1

No. 4617, WEEKLY, PRICE 1/6

Copyright

REGISTERED AS A NEWSPAPER

The VACULYSER

—a simple, silent, suction pump, for general use

The Vaculyser is a suction pump with a 3 pint capacity container designed to work off the Aerolyser Compressor. It provides full and efficient suction for a wide variety of uses including:

1. Gastric aspiration.
2. Intestinal intubation with a Miller-Abbot tube in intestinal obstruction.
3. Supra-pubic application in trans-urethral bladder drainage.
4. Aspiration of fluid from the pleural cavity.
5. Bronchoscopy.
6. Dental surgery.

The Vaculyser is portable and works off any suitable electrical point. The pump is compact and robust and is easily removed for cleaning. The exhausted matter is confined to the suction tube and receiving jar and cannot contaminate the mechanism.

IMPORTANT NOTE. *It is not advised that this unit be used in an ether-laden atmosphere.*

Price Complete	£23 . 5 . 0
Compressor Unit only	£18 . 0 . 0
Pump Unit only	£5 . 5 . 0

For further information please write to:

AEROSOLS LIMITED

65 OLD BROMPTON ROAD, S.W.7 Phone: KEN. 7495

DERMATOPHYTOSIS

AERO-PED—a preparation containing Phenylmercuric Nitrate in an o/w emulsion—constitutes a new and effective treatment for Tinea Pedis and allied mycotic affections.
AERO-PED is now extensively prescribed by the Medical Profession because:
(1) *It combines high antiseptic and fungicidal activity with low tissue toxicity.*
(2) *Inhibits bacterial decomposition of perspiration.*

AERO-PED

GERMICIDE - FUNGICIDE - ANTISEPTIC

ACTIVE CONSTITUENT
PHENYLMERCURIC NITRATE 0.05%

At the request of the Medical Profession we introduced a P.M.N. Dry Treatment for Tinea Pedis. AERO-PED is, therefore, also now available in powder form.

Clinical Samples gladly sent on request:—

AERO-PED LTD. (Dept. CL/1)
35 BESSBOROUGH PLACE, LONDON, S.W.1

Closed circuit anæsthesia

The simplicity and efficiency of the M.I.E. **Closed Circuit Unit** have made it for nearly ten years, the choice of the world's leading anæsthetists.

NOW AVAILABLE FROM STOCK

Specification on request from

MEDICAL & INDUSTRIAL EQUIPMENT LTD.
SPECIALISTS IN ANÆSTHETIC APPARATUS
12, New Cavendish Street, London, W.1.
Telephone: WELbeck 1851 & 1504

BRITISH MEDICAL JOURNAL

LONDON SATURDAY JULY 2 1949

British Medical Association

ONE HUNDRED AND SEVENTEENTH ANNUAL MEETING, HARROGATE, 1949

President's Address

MAN AND THE MACHINE

BY

C. W. CURTIS BAIN, *M.C.*, D.M., F.R.C.P.

Senior Physician, Harrogate General Hospital

During the course of his address last year Sir Lionel Whitby dealt with the changes in the practice of medicine which might follow the introduction of the National Health Service. I propose to consider a trend which has developed in recent years, and which might in some circumstances be accelerated by the new Service. I shall illustrate this trend by a study of the progress of events in cardiology, because that is the branch of medicine with which I am most familiar.

During the many centuries that preceded the discovery of the circulation by Harvey in 1628 the views of the profession upon this subject can only be described as queer. Following the teaching of Galen, they believed that the blood was manufactured in the liver from the food ; thence it circulated along the veins with an ebb-and-flow motion to all parts of the body. Some passed into the chest and reached a blind diverticulum—the right ventricle—and thence seeped to the lungs where it was rid of some of its impurities. The air, or pneuma, taken into the lungs was conveyed thence by the pulmonary veins to the left ventricle. Here it met a little blood which had trickled through invisible pores in the interventricular septum, and the highly purified mixture of air and blood was distributed along the arteries to the different organs. There was no connexion between the two circulations, nor did the heart act as a pump. Hence, although the pulse was examined from the early days of ancient Egypt, it is difficult for us to gather what was learnt from it, and the beginnings of the scientific approach to circulatory problems should be attributed to Sir John Floyer, who wrote in 1710. He had a watch constructed which ran for a minute only, and with its aid made accurate observations on the rate of the pulse in regard to age, sex, emotion, diet, and climatic conditions. He also noted alterations in frequency due to different diseases and in response to various drugs. The slowest pulse he recorded was 55, the fastest 132. It is interesting to note in passing that Floyer also wrote a book on the merits of bathing, which reintroduced the practice of hydrotherapy into this country and gave an impetus to the development of spas.

During the course of the eighteenth century Vieussens described the water-hammer pulse of aortic incompetence, as well as the back-pressure phenomena of mitral stenosis ; all the valvular lesions were recorded by pathologists such as Morgagni ; Heberden produced his classical description of the symptoms of angina pectoris ; and Withering in 1785 wrote his *Account of the Foxglove*. But the next great advance in technique did not come until 1819, when Laennec introduced the stethoscope. This caused attention to be focused upon cardiac murmurs, so that, although notable advances were made in other directions, including James Hope's conception of cardiac failure, and the recognition of Adams-Stokes disease, the nineteenth century is chiefly distinguished by its concentration upon the differential diagnosis of the valvular lesions. Curiously, although disease of the coronary arteries was recognized, what we now know to be cardiac infarcts were ascribed to chronic myocarditis.

Developments in Cardiology

At the turn of the century four developments took place which revolutionized the practice of cardiology. The first was the impact of Mackenzie. Although his instrument, the ink polygraph, is defunct, his work, which was largely carried out while in general practice at Burnley, fixed the attention of all upon the paramount importance of the heart muscle, and away from the obsession of the previous era with the murmurs of valvular deficiencies. This fundamental conception has formed the basis of nearly all the advances of this century. The second event was the discovery of the *x* rays by Roentgen in 1895, and the application of the new method to cardiac problems through orthodiagrams by Moritz in 1902. The third, and perhaps outstanding cardiological achievement, was the construction of the electrocardiograph by Einthoven in 1903. As so often happens in medicine, this was the culmination of the work of several men, of whom Burdon-Sanderson, of Oxford, with his capillary electrometer, and Waller should be mentioned.

The fourth advance is one upon which I might be permitted to enlarge because of its local interest. In 1896 Riva Rocci designed a mercurial sphygmomanometer which did not differ much from those in use to-day. About that time George Oliver was devoting his summers to his practice in Harrogate and his winters to research. Oliver had an inventive turn of mind, and in 1898 described a haemodynamometer to the Physiological Society, in which the blood pressure was recorded by means of a calibrated spring. Three years later he published records of blood-pressure readings showing the effects of exercise, of temperature, of age and weight on the same lines as Floyer

had done with the pulse two hundred years before. Sir Clifford Allbutt was then at Leeds and was interested in the problems of hyperpyesia, and so it came about that, after the introduction of the sphygmomanometer, blood-pressure readings were being taken regularly in the West Riding, and especially perhaps in Harrogate, before the rest of the country had become accustomed to them. Consequently the method was regarded with due suspicion for some time. Oliver was also an early believer in the bedside experimental method, and so came to inject his son with an extract of suprarenal tissue obtained from a local butcher. This sent up the boy's blood pressure and was directly responsible for the isolation of adrenaline. The name of Oliver is almost forgotten now, but I still treasure a letter from Wenckebach, written shortly before his death, in which he asks if I remembered his friend Oliver, for "he was a splendid man."

The Electrocardiograph

The electrocardiograph was first used to distinguish and classify the cardiac arrhythmias, most of which concern the auricles, and with this the name of Lewis will always be associated. Lewis bought an electrocardiograph for himself and was allowed to install it in a cellar at University College Hospital. With this instrument he was able to recognize auricular fibrillation in 1909, and in 1920 showed that the cause of the arrhythmia was a circus movement in the auricles. In his book, *The Mechanism and Registration of the Heart Beat*, he described many other forms of cardiac arrhythmia. But Lewis did much more than this. He founded a school of cardiology which attracted students from other lands, who, returning home, developed new lines of research in many directions. Thus from the period after the first world war the tempo of advance has been much quickened, and it will be easier henceforward to deal with each technique separately than to take them in chronological order. At this time, too, a group of physicians who were examining pensioners with heart disease decided to meet annually in order to discuss subjects of common interest. Thus was born the Cardiac Club, which in 1936 was expanded to the present Cardiac Society. It must be admitted with regret, however, that since the era of Lewis no great advance in cardiological technique has been initiated in this country.

A more extended use of the electrocardiograph was foreshadowed in 1920, when Pardee described specific changes in the curve following cardiac infarction. The addition of an apical chest lead in 1932 added considerably to the number of anterior infarcts which could be diagnosed. In 1934 Wilson began his work on the "V" unipolar precordial and limb leads, which reduce distortion from the remote electrode to a minimum. With this technique six chest leads are taken on a line extending from the right of the sternum to the mid-axilla. In selected cases another series may be taken higher up the chest in the third intercostal space. Sometimes oesophageal leads, which come into close contact with the back of the heart, may be added. By this method of electrical exploration of the heart few cases of infarction escape detection, and the site of the infarct can be determined with fair accuracy. Furthermore, from the presence or absence of Q waves and of R–ST displacements it is usually possible to say if the whole thickness of the ventricular wall has been affected or if the infarct is only subendocardial, while the number of precordial leads involved provides a clue to the size of the infarct. Ventricular hypertrophy causes changes in the chest leads; alterations in the position of the heart can be distinguished by the unipolar limb leads. But perhaps the main advantage of Wilson's technique is that it has placed the electrocardiographic abnormalities upon a firm basis of electrophysical fact. No longer is it necessary to learn the different types of curve by rote; the reason for the altered deflections can now be understood.

The Vector Cardiogram.—An adaptation of the electrocardiogram, of which more may be heard in the future, is the vector cardiogram, which was described by Schellong in 1937. A vector is a term denoting electromotive force, and it can be represented as a line, the length and direction of which show the magnitude and direction of the force. In the ventricles the vector at any given moment represents the electrical axis, and the vector cardiogram can be constructed from the electrocardiogram if the three standard leads are taken simultaneously. When the termini of the serial positions of the vectors are joined together they will be seen to form a loop. By means of a cathode-ray tube it is possible to record this loop on a fluorescent screen. In pathological conditions the loop takes abnormal forms, and it may be that the vector cardiogram will be found eventually to be a more convenient way of recording myocardial lesions, such as infarcts, than the electrocardiogram.

X-ray Examination of the Heart

X-ray investigation may be made by cardioscopy or by examination of the antero-posterior and two oblique films. Kymography is also used in some centres.

Cardioscopy is as important a part of the examination of the heart as electrocardiography. Not only can a general enlargement of the heart be made out with far greater accuracy than by palpation or percussion, but changes in the shape of the organ enable enlargement of the different chambers to be recognized. The type of pulsations is also important, and those in the left ventricle may vary from the wide excursions of aortic incompetence to the localized absence, or even systolic expansion, found in anterior infarction. In a moving object like the heart much more can be learnt from cardioscopy than from films, which are mainly useful for purposes of record. It is true that measurements made from films enable the transverse cardiac diameter to be calculated, and the relation of this to the internal diameter of the chest can be ascertained; but in doubtful cases tables based upon the weight and surface area of the patient must be consulted, and for ordinary purposes the opinion of an experienced observer during cardioscopy is just as reliable.

Kymography.—In 1912 Gott and Rosenthal described a method of recording the pulsations of the borders of the heart by means of a multiple slit grid, and in 1931 the method was developed by Stumpf. A kymogram preserves as a record the variations in pulsation that can be seen on cardioscopy, and is used in many centres both in the localization of infarcts and in such conditions as constrictive pericarditis, in which all pulsation is minimal.

The Vital Capacity; Circulation Rate

The vital capacity test was described first by John Hutchinson in 1846 for use in pulmonary diseases, but in 1921 Peabody applied the method to the problems of cardiac dyspnoea. The test is quick and very easy to do: the patient merely breathes out into the spirometer as deeply as he can after the biggest possible inspiration. A young athlete should exceed 5,000 c.cm.: the patient with cardiac failure can barely manage 1,000 c.cm. Obesity, thyrotoxicosis, and psychasthenia all lower the vital capacity. The results can be corrected in accordance with a scale for height and

weight. But much more can be gleaned by watching the test being performed. A normal subject of feeble type merely puffs into the tube, and has to be pressed into producing 1,500 c.cm. or so. The young athlete blows the spirometer up to 5,000 c.cm. or more at once—an all-out effort with a quick ending. The former athlete, now developing emphysema, reaches nearly the same level by squeezing out the last few hundred c.cm. with the utmost determination. Indeed, as Hope Gosse pointed out in a personal communication, this prolonged ending is as good a functional test of emphysema as we have, and in the lower ranges is seen also in patients with heart disease complicated by emphysema. A Hutchinson spirometer is a valuable addition to the armamentarium of the cardiologist as well as of the chest physician.

In 1926 Blumgart and his associates injected a radioactive substance into the brachial vein and were able to detect its arrival at the brachial artery of the other arm. Thus they were able to measure the time taken by the blood to flow up the vein to the heart, through the pulmonary circuit and back to the left side of the heart, and finally out to the arteries of the arm. Many other more simple, but nevertheless less accurate, tests have since been devised for the same purpose, the end-point being obtained either by a taste as in the decholin test, or by a flush as in the histamine test. The ether test measures the time taken from the brachial vein to the lungs; the amyl nitrite test the time from the lungs to the face. Tests of the speed of the blood-flow are helpful only within limits. Apprehension, thyrotoxicosis, and severe anaemia all increase the speed. If in heart failure the speed is slow, and the time lengthened, the end-point may be difficult to make out owing to dilution of the injected substance. Also, the end-point in many of them, such as the decholin and saccharin tests, is subjective, depending upon the appreciation of a taste, and the reaction time of different patients is apt to vary. But the tests take little time and require no apparatus, and within their limits they can provide useful information.

Phonocardiograms; Venous Pressure; Catheterization

In 1894 Einthoven devised a method of recording the heart sounds. In 1912 Lewis, by means of sound-tracings, elucidated the nature of the additional heart sound that causes gallop rhythm. Interest in phonocardiograms then lapsed till a few years ago, but now several types of instrument are on the market. Phonocardiograms register the vibrations which produce the heart sounds and murmurs, and they enable these to be timed. Successive records may show the progress of events in one patient. It is not certain yet if the tracings are reliable enough to be submitted as satisfactory evidence of a valvular lesion in cases where oscillations appear and yet no murmur is present. If not, they would not seem to offer any great advantage over auscultation.

It has long been customary to gauge the venous pressure by observing the fullness of the veins in the neck or under the tongue, but direct measurement of the venous pressure dates from 1910, when Moritz and Tabora introduced a large-bore needle into the vein at the elbow and attached it to a saline manometer. Since then various modifications have been devised, of which the most recent has the advantage that a fine needle can be used. The venous pressure provides a measure of the filling pressure of the right side of the heart. In health it varies from 4 to 10 mm. Hg: in heart failure it may rise to 30 mm.

In 1929 Forssman passed a ureteric catheter through his own median basilic vein into his right auricle. He then walked to the *x*-ray department and had it photographed *in situ*. In 1932 radio-opaque material was passed through the catheter into the heart by Monis and Carvalho in Spain, and pictures were obtained of the pulmonary vessels. In 1944 Cournand and Ranges left the catheter in position for an hour without detriment to the patient. This new method has led to important advances in three directions: it has enabled the pressures in the right auricle and ventricle to be measured directly; accurate estimations of the cardiac output can now be made; the catheter may be used to introduce radio-opaque material for angiocardiography.

Right Auricular and Right Ventricular Pressures.—In 1946 Cournand attached a manometer to the catheter and was able to measure the pressure in the right auricle and right ventricle. In health the pressure in the right auricle is about zero; in right ventricular failure it may rise to 30 mm. Hg, at which level it is as high as the pressure in the veins. In the right ventricle the systolic pressure is normally about 25 mm. Hg, while the diastolic pressure is about zero. In right ventricular failure the systolic pressure may rise to above 100 mm.

Cardiac Output

To measure the cardiac output by the principle of Fick it is necessary to know the difference in the oxygen saturation of the arterial and venous blood. Since different streams of venous blood returning to the heart vary in their degree of oxygen unsaturation it is an advantage to be able to take samples from the right auricle. To ensure thoroughly mixing, samples are now taken from the right ventricle or pulmonary artery. A sample of arterial blood must also be obtained, and for this an in-dwelling needle has to be inserted into the femoral artery. When the samples have been secured a rather complicated gas analysis is needed in order to calculate the arteriovenous oxygen difference. The test therefore requires a team, each member of which must be skilled in the part he has to play. Estimations of the cardiac output are accurate only if the patient is relaxed, and relaxation cannot always be easy to procure with a catheter in the heart and a needle in the femoral artery. Using this method, McMichael and Sharpey-Schafer have been able to show that while in most forms of heart failure the output is rather low, in conditions such as anaemia, thyrotoxicosis, or emphysema a high output is needed, and congested heart failure may be present while the output is still above the normal level.

The ballistocardiograph, designed by Starr in 1941, provides another means of obtaining the cardiac output. The blood ejected from the heart in systole, as it moves towards the head, makes the body recoil towards the feet. When the column of blood strikes the arch of the aorta the body recoils upwards. The forces of these two movements can be measured. The patient lies upon a table, which is suspended so that all but the longitudinal movements are prevented. The movements of the body on recoil are resisted by a spring, and photographed. The method is not claimed to be as accurate as estimations made by the principle of Fick, but arterial and venous punctures are avoided and so it is more feasible for the patient to relax.

Angiocardiography

In 1937 Castellanos injected "diodone" intravenously into children with congenital heart disease and succeeded in visualizing the different chambers of the heart. Since then the method has been developed by Chávez in Mexico, where the injection is made into a cardiac catheter inserted into the jugular vein, and in the United States.

Angiocardiography provides the same information for the heart that a barium meal does in the stomach. By means of a series of rapid exposures taken at one-second intervals, the opaque material can be seen to fill in sequence the right auricle, the right ventricle, the pulmonary vessels, the left ventricle, and the aorta. If a defect is present in the auricular or ventricular septa the left ventricle and aorta will become opaque earlier than usual. A dextroposed aorta is clearly seen; so is a patent ductus in which the shadow of the pulmonary artery persists owing to the flow of blood into it from the aorta through the ductus. But angiocardiography presents certain difficulties.

The procedure entails the introduction of a large-bore needle or cannula into the vein at the elbow. Unless a general anaesthetic is given, the concentrated solution of diodone causes an unpleasant burning sensation in the head. In adults with thick chest walls it is difficult to get enough penetration to make the outline clear. It is not possible to say how general an application the test may come to have in cardiac diagnosis. So far it has been used in this country mainly in children for whom an operation for the relief of pulmonary stenosis is being considered. It seems likely, however, that improvements in technique will lessen some of the present difficulties and increase the scope of this valuable diagnostic aid.

Volume of the Heart

A method of investigating the volume of the heart was devised by Nylin in Stockholm in 1943. Two simultaneous skiagrams are taken at right angles to each other, and then both the transverse and antero-posterior diameters of the heart can be measured. From these the volume can be calculated. The results obtained compared well with direct measurements of the volume made later at necropsy. In some very large hearts the volume was almost two litres, which is about half the total volume of the blood found in normal subjects. With a cardiac output of about four litres a minute this would mean that the blood would take nearly fifteen seconds to pass through each ventricle, which is not far short of the total time taken by the blood to travel from the vein at the elbow through the right ventricle, the pulmonary circuit, and the left ventricle to the tongue in normal subjects.

Radiocardiography, introduced by Prinzmetal in 1949, allows this emptying time of the heart to be measured. Radioactive sodium is injected intravenously, and the concentration of the particles is obtained by a Geiger-Müller counter and recorded on a revolving drum. In normal subjects the radioactive material passes rapidly into the right ventricle and a large deflection is inscribed. It is then diluted in the pulmonary vessels so that the left ventricular deflection which follows is smaller and more prolonged. When either ventricle is dilated it empties more slowly, and the descending limb is correspondingly lengthened. If the filling pressure is increased the ascending limb will be more oblique. When the left ventricle is at fault, the two deflections may be fused. A delay in the emptying of the right ventricle will cause the blood to pass more slowly into the pulmonary system, and this of itself will lead to a slow upstroke of the left ventricular deflection. Otherwise, the test measures the emptying time and indicates the filling pressure of each ventricle separately, and may be expected to add to our knowledge of the haemodynamics of cardiac failure.

Volume of the Blood; Capillary Pressure

It might be thought that an estimation of the total volume of the blood was hardly necessary for the solution of cardiac problems, but this is far from the case. An increase in the blood volume may be the earliest change in the circulation to follow the weakening of the strength of the heart beat. A slight diminution in the flow of blood to the kidneys may lead to retention of salt and thus to an increase in the volume of the blood in order to maintain the osmotic pressure. The first clinical test was introduced in 1937 by Evans, who injected a known quantity of a blue dye. Blood samples, taken when equilibrium had been reached, enabled the dilution of the dose to be estimated, and so the volume of the blood could be calculated. The method is not very accurate and has the disadvantage of turning the patient blue for some time. Radioactive red cells have recently been injected and samples taken from the brachial artery of the other arm. Greater accuracy is claimed, but no results have yet been published in this country. The blood volume, which normally is about four litres, is always increased when clinical oedema is present.

By means of very fine capillary pipettes, Landis in 1930 was able to measure the pressure at the venous and arterial ends of the capillary loop. Normally the positive pressure in the capillaries, which would tend to allow fluid to escape into the tissues, is balanced by the osmotic pressure of the plasma proteins, which holds it back in the vessels. In cardiac failure the raised venous pressure destroys this balance and oedema forms. Complicating factors occur in polycythaemia, when the plasma proteins are increased, and oedema may not be present even though the venous pressure is high. The reverse is seen when the plasma proteins are low, as in nutritional oedema, in which the circulation may be normal.

Procedure

The complete investigation of a patient with heart disease may therefore be a complicated affair: it comprises an electrocardiogram, with standard, unipolar precordial, and limb leads, oesophageal leads, and a vector cardiogram; *x*-ray examination, including cardioscopy, skiagrams in three positions, and a kymogram; measurement of the vital capacity; phonocardiograms to register the abnormal vibrations due to valvular disease; recording of the arterial, venous, and capillary pressures and of the right auricular and right ventricular pressures by means of a cardiac catheter; cardiac catheterization to obtain the cardiac output if this is not done by means of a ballistocardiogram; measurement of the circulation time; estimation of the volume of the heart with skiagrams, that of the blood by means of the blue dye or with tracers—tracers will also enable the emptying time of each ventricle to be ascertained by radiocardiography—angiocardiograms, in all cases in which a shunt is suspected, to interpret doubtful or unusual shadows seen on cardioscopy or in a skiagram. To these must be added blood tests such as the erythrocyte sedimentation rate in cardiac infarction; the cytology of the blood when anaemia plays a part in the causation of heart failure; a blood culture in infective endocarditis; and the Wassermann reaction. In suspected thyrotoxicosis a basal metabolic rate may be required.

With all this multiplicity of tests one wonders what in the future may be the position of the clinician. He cannot hope to do all the tests on each patient himself. Should he delegate the work of investigation to others? If so, which tests and to whom? The blood examinations fall naturally into the province of the pathologist, but most of the remainder, including cardiac catheterization, seem clearly to come within the scope of the cardiologist. If they were to pass into the province of another department, such as

thoracic surgery, that department would have to assume responsibility for the final diagnosis.

On the other hand, if a team of investigators performs all these tests on every patient with heart disease, is the clinician as we know him really necessary? Reliance upon tests engenders a certain habit of mind in which more confidence is felt in a figure than upon an opinion based on clinical judgment. Indeed, it has been rumoured that in certain more advanced stations the clinician has already been found to be redundant, and his place has been taken by an integrator who, by assessing the results of the investigations statistically, has been able to come to a diagnosis and decide on treatment without seeing the patient at all.

Valuation of Tests

All the masters of medicine have insisted on the importance of an accurate history. Unless the patient is carefully questioned regarding his symptoms diagnosis will suffer. We may therefore dismiss at once the notion that the clinical examination can be superseded. Should we then go to the other extreme and discard all tests, or at least all tests which cannot be performed by the clinician at the time of his examination, as being without value? The answer surely is "No"; but we should discriminate, and by using each test in its proper place avoid making them our masters.

No one should practise cardiology who has not had a thorough grounding in electrocardiography. The electrocardiograph is an instrument of precision. It has great uses but also limitations. In inexpert hands it can be quite dangerous. Hospital cardiographic departments should be entrusted only to those who have been trained in a recognized cardiac department. The same applies to the *x*-ray examination of the heart. The art of cardioscopy is not to be learnt in a day. Yet a correct appreciation of the size of the different chambers of the heart is almost, if not quite, as important an adjunct of the examination of cardiac patients as is electrocardiography. To these two tests I would add another—namely, the vital capacity—because so much can be gleaned from it and it takes so little time. These three should form part of the routine examination of patients with heart disease, as much as the recording of the blood pressure and the auscultation of the heart sounds.

Mackenzie had nothing but scorn for those who would "use an assistant to take an *x*-ray photograph of the heart and an electrocardiogram, and even blood pressure readings, and then sit down to study the report." Not much, in fact, is gained by taking an electrocardiogram, or the blood pressure oneself, but the remainder should not be left to subordinates. If one would not accept the findings of another on auscultation, it is difficult to see why his findings on cardioscopy should not equally require verification.

Tests of the speed of the circulation require no apparatus and take little time. They are available to anyone who cares to use them. But the information they give is often disappointing, and it is doubtful if they are worth including in a routine examination.

Accurate measurements of the venous pressure are helpful in many ways both in the prognosis of cardiac failure and in assessing the results of treatment. When the apparatus with a fine needle is generally available, venous pressure measurements will probably be included in the examination of patients with heart failure.

The exploratory work on angiocardiography has so far been done mainly by cardiologists, but the problems concerned are almost entirely radiological. A series of rapid exposures have to be made with sufficient penetration to visualize the bolus of diodone as it passes through the heart. Probably, as time goes on, the technique will fall more and more into the field of the radiologist, and cardiologists will ask for the additional information in appropriate cases. Angiocardiography will then have to be made available in all hospitals where a cardiac clinic is established.

It is a regrettable fact that when surgeons invade a province hitherto considered to be purely medical, diagnosis almost at once becomes more exact. Not so long ago the diagnosis of congenital morbus cordis was considered quite adequate by paediatricians. It is true that the development of cardiac radiology directed the attention of cardiologists to the congenital lesions years before any operative intervention was considered feasible, and main types, such as the tetrad of Fallot, valvular pulmonary stenosis, atrial septal defect, coarctation, and the patent ductus, were recognized clinically. But the advent of thoracic surgery, and especially of the Blalock–Taussig operation, has opened a new field, and now pulmonary atresia, tricuspid atresia, and major and minor degrees of transposition are distinguished. For this, angiocardiography and cardiac catheterization are often required.

Cardiac catheterization is difficult and laborious. To obtain a thorough mixing of the venous blood the catheter may need to be pushed as far as the pulmonary artery. This takes time, and there are many pitfalls, as the tip of the catheter may double back and appear in unexpected places. If the catheter passes from the right auricle to the left or from the right to the left ventricle the pressures will alter and the samples will change from venous to arterial blood. Hence the importance of the procedure in establishing the presence of shunts in congenital heart disease. Otherwise it is useful chiefly owing to the possibility of observing directly the changes in pressure of the different chambers of the heart, and changes in the cardiac output, caused by heart failure or induced by drugs. It would seem probable that cardiac catheterization will be performed only in hospitals large enough to have a thoracic surgical unit or at research centres.

Most of these tests were devised for purposes of research. They were developed at single centres, and were later adopted generally because they were found to be useful in diagnosis. Other methods are still in the stage of development. They may or may not come to have a general application. Such are the ballistocardiogram, the radiocardiogram, and the measurement of the volume of the heart.

The ballistocardiogram enables the cardiac output to be obtained without the unpleasantness of a cardiac catheter and an arterial puncture. But estimations of the output do not help much in the diagnosis and treatment of patients with heart disease. Those with "high-output failure" have also fast circulation rates, and the circulation time is an easy test to do. In ordinary congestive heart failure the output falls only a little, and estimations of the cardiac output are unlikely ever to form part of the routine investigation of such patients.

The radiocardiogram and the estimation of the volume of the heart have opened up a new approach to the problems of heart failure. They have shown that the dilated heart empties itself slowly. With the radiocardiogram the emptying time of each ventricle can be measured separately. The test is very recent, but it is certainly important, and we may expect to hear more of it in the future.

A Suggestion

Almost all of these various techniques have been devised either in Germany or, more recently, in America. Since the war we have been engaged in making up for the lost years and bringing ourselves up to date. A major difficulty has been the necessity for importing all the apparatus required, most of which is expensive and has to be paid for in dollars. The result is that only a little is available in a few centres. We would not wish this state of affairs to continue, but should prefer to regain the position we held during the time of Lewis, developing our own lines of research and constructing for ourselves the apparatus we need. The problem is how this may best be done, having regard to the probable financial state of the country during the next few years.

The Medical Research Council finances some specific investigations and supports research establishments at certain centres, such as at University College Hospital, where Lewis worked. But this does not seem to be enough. We must encourage research at all levels, in small hospitals as well as large. Some men work better in a team, others when left to pursue their own lines of thought. We should not forget that Mackenzie revolutionized the ideas of his time while engaged in general practice, and was not looked upon with any favour by the authorities whilst doing so. Even Lewis had to buy his own electrocardiograph. If research is confined to a few centres, only those projects that commend themselves to the directors of the centres may receive attention.

A possible solution might be for the specialist organizations to have some share in the control of the funds to be expended, or else they might form advisory committees of the Medical Research Council. For research in cardiology the Editorial Board of the *British Heart Journal* might be appropriate. A man who wished to investigate some point could submit his plans, together with his needs in regard to apparatus; and, if the project was approved, arrangements could be made for the apparatus to be constructed for him. Promising lines of research would thus be scrutinized by those who later would be responsible for accepting the work for publication. If this method were combined with the normal research carried out at approved centres, a man with an original mind should find sufficient opportunity to try out his ideas.

New techniques are designed primarily in order to advance knowledge. As such they are to be commended. No country that is not active in research can be considered to be in the forefront of the battle against disease. Tests, too, lead to greater precision in diagnosis and treatment. Some, such as electrocardiography and cardioscopy, are in daily use; others, such as angiocardiography and radiocardiography, may well in the future be required as a routine in selected cases. Cardiac catheterization offers a ready means of assessing the efficacy and mode of action of cardiac drugs. The danger of tests lies in the risk that undue reliance may be placed upon them at the expense of the clinical examination, leading eventually to the stage when an electrocardiogram is required before a normal heart can be diagnosed. If ever the National Health Service were controlled by a bureaucracy these tests might be demanded as part of the opinion by a specialist. It is to be hoped, therefore, that advice will continue to be accepted from medical committees, whose members represent the best interests in the profession, so that tests may not be allowed to exceed their proper function as the tools of clinical medicine.

In the historical survey free reference to *A History of the Heart and Circulation* by Willius and Dry (1948) has been made. Other references are given below.

REFERENCES

Blumgart, H. L., and Weiss, S. (1927). *J. clin. Invest.*, **4**, 15.
Castellanos, Pereiras, and Gacia (1937). *Arch. Soc. Estud. clin. Habana.*
Chávez, I., Dorbecker, N., and Celis, A. (1947). *Amer. Heart J.*, **33**, 560.
Cournand, A., and Ranges, H. A. (1941). *Proc. Soc. exp. Biol., N.Y.*, **46**, 462.
Einthoven, W. (1903). *Pflug. Arch. ges. Physiol.*, **99**, 472.
—— and Geluk, M. A. J. (1894). Ibid., **57**, 617.
Floyer, J. (1710). *The Physician's Pulse Watch.* London.
Forssman, N. W. (1929). *Klin. Wschr.*, **8**, 2085.
Gibson, J. G., and Evans, W. A. (1937). *J. clin. Invest.*, **16**, 301.
Gött, T., and Rosenthal, J. (1912). *Münch. med. Wschr.*, **59**, 2033.
Harvey, W. (1628). *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus.* Francofurti.
Heberden, W. (1772). *Med. Trans. Coll. Phys. Lond.*, **2**, 59.
Hutchinson, J. (1846). *Med.-chir. Trans.*, **29**, 137.
Laennec, R. T. H. (1819). *De l'auscultation médiate.* Paris.
Landis, E. M. (1930). *Heart*, **15**, 209.
Lewis, T. (1911). *Mechanism of the Heart Beat.* London.
Mackenzie, J. (1902). *The Study of the Pulse.* Edinburgh.
McMichael, J., and Sharpey-Schafer, E. P. (1944). *Brit. Heart J.*, **6**, 33.
Monis, E., Carvalho, L. de, and Saldanha, A. (1932). *J. Radiol. Electrol.*, **16**, 469.
Morgagni, J. B. (1761). *De Sedibus et Causis Morborum per Anatomen Indagates Libri Quinque.* Venetus.
Moritz (1902). *Münch. med. Wschr.*, **49**, 1.
Nylin, G. (1943). *Amer. Heart J.*, **25**, 598.
Oliver, G. (1901). *Blood and Blood Pressure.* London.
Pardee, H. E. B. (1920). *Arch. intern. Med.*, **26**, 244.
Peabody, F. W. (1921). *Med. clin. N. Amer.*, **4**, 1655.
Prinzmetal, M., Corday, E., Spritzler, R. J., and Flieg, W. (1949). *J. Amer. med. Ass.*, **139**, 617.
Riva Rocci, S. (1896). *Gaz. med. Torino*, **47**, 981.
Schellong, F., Heller, S., and Schwingel, E. (1937). *Z. KreislForsch.*, **29**, 497.
Starr, I. (1941). *Amer. J. med. Sci.*, **202**, 469.
Stumpff, P. (1934). *Fortschr. Röntgenstr.*, **49**, 211.
Vieussens, R. (1715). *Traité Nouveau de la Structure et des Causes du Movements Natural du Coeur.* Toulouse.
Wilson, F. N., Johnston, F. D., MacLeod, A. G., and Barker, P. S. (1934). *Amer. Heart J.*, **9**, 447.
Withering, W. (1785). *An Account of the Foxglove.* Birmingham.

TUBERCULOUS EMPYEMA

BY

D. A. ANDERSEN, M.D., F.R.C.S.

The purpose of this paper is to present the results of a "follow-up" of a series of 74 cases of tuberculous empyema treated in a period of seven years, from 1941 to 1947, in Norwegian hospitals. With six exceptions the patients were all admitted to the Third Department of the Ulleval Municipal Hospital, Oslo, under the care of Dr. Carl Semb. They came from other hospitals or sanatoria, or were referred by chest physicians in various parts of Norway.

Details of Follow-up Method

Every case of tuberculous empyema discharged from the department between Jan. 1, 1941, and Dec. 31, 1947, is included in the series. In 19 the condition of the patients did not allow of any major surgical treatment; in 55 a plastic operation on the chest wall was carried out.

According to information obtained up to May, 1948, 25 have died. Of the 49 survivors 43 have been followed up fully and their condition ascertained; in six cases the follow-up was incomplete. Where possible the patients attended Ulleval Hospital and 16 were examined by me. The local and general condition, the presence or absence of a fistula, the vital capacity, the sedimentation rate, and the presence or absence of tubercle bacilli in the sputum were determined, together with a straight radiograph in each case and a planogram series when indicated. The

33 unable to attend personally were adequately followed up in the same manner by a recognized tuberculosis specialist or sanatorium physician in their area, except in the six cases already referred to.

The immediate local results were judged four months after the operation, and this information was available in all cases. As regards late results, 20 cases have been followed for over three years, 13 for from one to three years, and 16 for under one year.

Examination of the final results so far available shows that when an adequate thoracoplasty was carried out the satisfactory result was permanent, with the exception of one case in which, four years after the operation, a cold abscess of the chest wall developed just below the lowest part of the scar.

In no case did a patient have a recurrence of any symptoms due to tuberculous activity in the lung on the same side as the thoracoplasty, although two of the patients operated on subsequently died of disease of the opposite lung and two had active disease of the opposite lung and other organs.

Definitions

"Empyema" and "Tuberculous Empyema."—In this series the tubercle bacillus was demonstrated after admission by direct examination, culture, or guinea-pig inoculation in 55 cases in the pleural exudate, and was not found in 19. However, in view of the fact that the tubercle bacillus is often found in simple tuberculous effusions, which are later reabsorbed and never develop into empyemas, its presence or absence is not in itself adequate for diagnosis. Further, we know that repeated examinations of the exudate are sometimes necessary before the bacillus can be demonstrated, and in one of our cases pleural tuberculosis was proved only by a biopsy and microscopical examination of the pleura. Therefore, the general statement needs to be made that a "tuberculous empyema" means "a purulent exudate in which the tubercle bacillus is demonstrated or, in the absence of the specific bacillus, there is proved tuberculosis in the underlying lung, without any other obvious cause of the empyema being present."

In 12 of the 19 cases in which the tubercle bacillus was not discovered secondary infection was present, and it seems that the bacillus is more difficult to find in this group. In five cases there was no record of an examination, some of these having been admitted almost moribund. I should like to draw special attention to one of the two remaining cases with negative results, because it extends the conception of the indications for surgical treatment.

The patient had active destructive tuberculosis of the right upper lobe for which a pneumothorax was induced. There were apical adhesions suspending a cavity. Five weeks later he suddenly had a rigor followed by acute pain in the right side of the chest. Nine hours later the right side of the abdomen was rigid, and the diagnosis of a perforated appendix was considered. However, screening showed a pleural exudate and a mediastinal shift to the opposite side, and gradually the pulmonary dyspnoea became more obvious, and a correct diagnosis of ruptured cavity was made. On aspiration a few days later no tubercle bacilli were found in the exudate, which was clear, and yet, because an empyema was practically inevitable, a thoracoplasty was done 18 days later at the request of the physician.

This case illustrates a small but most significant group of what may be called "incipient empyema" cases. There were five in this series; these were operated on, with cure, before the exudate became purulent. Experience has shown this to be the safest treatment. This group extends the conception of cases requiring surgical treatment to "a progressive tuberculous exudate in a pleural space that has got out of the control of the physician who has induced a pneumothorax." That is to say, the fluid rapidly returns after tapping, and the cavity can neither be emptied nor be obliterated by obtaining expansion of the lung.

The question of how long the physician is justified in continuing medical as opposed to surgical treatment in such cases of progressive tuberculous effusions and of established empyemas is an important one, and an attempt will be made to show the influence on the final results of this time interval between the onset of the empyema and the stage at which the patient reaches the thoracic surgeon.

The terms used in stating results are "cured," "improved," "unimproved," and "died."

Cured.—This indicates full clinical and radiological cure, with no residual empyema cavity shown by radiography, no fistula, and no active tuberculous disease (T.B. negative) in the lungs or other organs. Of 28 patients so classified after thoracoplasty I examined 10 myself, the remainder being examined elsewhere by physicians concerned in the after-treatment. The impression given by the group I saw was that of people in normal activity although unable to undertake heavy exertion. All except one, recently operated upon, were in work, four being housewives, four men on light work, and one a medical student. Their vital capacity varied from 1,000 c.cm. in a small woman to 2,400 c.cm. Seven had 90 to 100% of full arm movement, two had limitation by about 30% in abduction, due to some degree of scapular fixation, and one had poor arm movements with serious disability. There was appreciable scoliosis in four cases, convex to the side of the operation, and none or practically none in the remainder. In those cases with scoliosis, close observation when they were clothed revealed a characteristic position, with the base of the neck carried a little to the opposite side, and the neck adjusting the curve sharply; but they would all have passed in a crowd as normal.

Improved.—This group includes any fistula after operation or drainage (of which there were only six in all) where the general condition was satisfactory, and also those with *x*-ray evidence that there was still, possibly, residual fluid even though there were no clinical symptoms. An early radiograph gives no evidence about this unless air is present, but later radiographs often do so, a distinction being sometimes possible between residual fluid and pleural thickening by noting the contour of the opacity. If it is straight it is probably just pleural thickening, if convex it is probably residual fluid. In one case with this appearance, aspiration 18 months after operation showed clear fluid. The prognosis in this group is good. Early effusions left after limited thoracoplastics can (as discussed below) be expected to absorb, and recent fistulae have a good probability of closing if the cavity is collapsed fully. I examined four patients in this group, and all were in work, although for reasons already given they were not considered "cured."

Unimproved.—This group is illustrated by two patients seen by me, one of whom had active tuberculosis of the other lung and a vital capacity of 700–800 c.cm.; the other had uncontrolled disease of the opposite lung, spine, and kidneys. In both the local condition as regards the empyema was satisfactory.

Aetiology

The series can be divided into two main groups: (*a*) spontaneously arising cases (20), and (*b*) those arising as a complication of pneumothorax treatment (54). Broadly speaking, the spontaneous empyemas are *local* empyemas (except for those following spontaneous pneumothorax), while practically all the empyemas following pneumothorax treatment are *total*.

Total empyema provides a surgical problem of peculiar difficulty because the free pleural space, obtained purposely

by the physician, extending up to the apex and medially to the hilum, is extremely difficult for the surgeon to close when it is infected and has stiff walls.

In spite of this difficulty the prognosis of the local or partial empyema group is worse than the total one, because the case of partial empyema when it reaches the surgeon usually shows a mixed infection—as in 18 (90%) of the spontaneous cases compared with 20 (37%) of those following pneumothorax treatment. This high percentage of secondary infection in the local group is often associated with active and sometimes with pneumonic forms of tuberculosis in the underlying lung. The aetiology of the two groups is shown in Tables I and II.

TABLE I.—*Aetiology of Spontaneous Cases*

	No. of Cases	Incidence of Secondary Infection
Post-primary pleurisy	7 (T.B. negative, 2; T.B. positive on gastric lavage, 5)	6
Gradual onset in active pulmonary tuberculosis	4	4
Following acute febrile pneumonic type of disease	7 (T.B. negative, 1 (exudate +); T.B. positive, 6)	7
After spontaneous pneumothorax	2	1
Total	20	18

TABLE II.—*Aetiology of Cases following Pneumothorax Treatment (54 Cases)*

12 cases followed acute reaction immediately after closed intrapleural pneumolysis
8 cases followed cavity rupture
2 cases followed spontaneous pneumothorax (suspected cavity rupture)
2 cases followed open intrapleural pneumolysis
4 cases related stenosis main bronchus, proved by bronchoscopy
3 cases related atelectasis without proved stenosis
23 cases in or following uncomplicated pneumothorax
Secondary infection occurred in 20 cases (37%).

It is to be noted that the empyema can occur not only during the course of the A.P. treatment but also after the A.P. has been abandoned as contraselective or because of persistent effusion. The case histories in this group show the onset at periods from shortly after the induction till many years after the A.P. is abandoned. An example will illustrate this.

A.P. induced in 1934, right side, for destructive disease. Effusion after six months. A.P. maintained till 1937. Then phrenic avulsion. Under medical control, well and working but with known persistent fluid. The time when the effusion became purulent is not known, but an empyema was diagnosed in 1942, eight years after the A.P. was induced, when the patient was admitted to Vardasen Sanatorium following a febrile "cold."

If a pneumothorax is abandoned because of a persistent clear effusion it is necessary to follow the progress of the effusion till it is absorbed, or, if there is no evidence that this will occur in the course of two or three months, then a surgical colleague should be consulted about future treatment.

A mixed infection alters the prognostic picture adversely. Its frequency is very high in any large series, and in the present one it is 38 out of 74 (Table III). The threat therefore hangs over every case of tuberculous empyema and the danger of secondary infection does not diminish with time in an untreated pure empyema. The following case illustrates this.

TABLE III.—*Aetiology of Secondary Infection (38 Cases)*

Known bronchial fistula	17
Acute pneumonic infection of lung with T.B. plus	7
External fistulae	5
Febrile "cold"	1
Unknown (? bronchial fistulae)	8

Case 11.—A woman had an A.P. induced in 1923 and a positive diagnosis of empyema was made in 1924. There is no information about the condition in the years that followed except that in 1939 a radiograph showed evidence of persistent pleural opacity. She was clinically well till she had an attack of bronchopneumonia in 1941, and in 1942 she developed an empyema necessitatis with stinking pus and died after drainage. This was 18 years after the known onset of a pure empyema, which was not treated.

One of the main causes of secondary infection appears to be bronchial fistula. However, not all the cases with clinically evident fistulae by any means develop clinical or bacteriological evidence of secondary infection, but the incidence of known fistulae is somewhat higher (47%) in the secondarily infected group than in the pure tuberculosis group (39%). Details of the proved fistulae are given in Table IV.

TABLE IV.—*Definite Pleurobronchial Fistulae (31 Cases)*

Diagnosis by the following means:	
Coughed-up empyema pus	9
Definite cavity rupture (radiological evidence)	8
Spontaneous pneumothorax	5
Pressure measurements	3
Contrast radiographs	3
Demonstrated at thoracoscopy	1
" " open operation	1
Taste in mouth of substance injected into empyema	1

There were 14 cases of fistula among the 36 cases with no secondary infection; of these, seven followed cavity rupture and three spontaneous pneumothorax, when the fistulae were probably short-lived. Among the cases with secondary infection there were 17 fistulae.

Diagnosis of Secondary Infection.—This was made clinically and bacteriologically. In 33 of the 38 cases the secondary organisms were demonstrated by aerobic or anaerobic culture. In one the clinical condition of stinking pus determined the diagnosis in the absence of a positive bacteriological report, and in four it was assumed because of long-standing open drainage of the empyema cavity at earlier operations.

Pathology

Hedblom's (1932) classification of tuberculous empyema, based on the fundamental pathology, is used in this series. He divides the disease into four distinct pathological types: —pure empyema without pulmonary disease (Group I); pure empyema with pulmonary disease (Group III); mixed empyema without (Group II) and with (Group IV) pulmonary disease.

Group I and II are less common. They comprise cases in which, for example, localized empyema follows a pleurisy, or in which collapse treatment has been carried on for many years and the pleural cavity has become infected but there is at the time of operation no tubercle bacilli in the sputum. A minimum period of three years T.B.-negative has been arbitrarily chosen as indicating no active tuberculosis of the lungs. Collapse treatment is not needed in these groups.

Results of Operation

Table V shows the number of cases in each group and the results obtained. It will be noted that the prognosis gets progressively worse from Groups I to IV, as is to be expected from the underlying pathology.

The picture given is perhaps unduly gloomy, because this series included 19 unoperated cases referred to later in more detail. Further, there is a high proportion of cases classified as "improved" which are clinically satisfactory, and a majority of these may proceed to full cure in time. But

TABLE V.—*Clinical Results in 74 Cases of Tuberculous Empyema*

Group	No.	Cured	Improved	Unimproved	Died
I a	1	1			
II a	4	2		1	1
II b	4	3			1
III a	30	13	9	2	6
III b	5	2	1	1	1
IV a	16	6	1	1	8
IV b	14	3	1	2	8
Total	74	30 (40·5%)	12 (16%)	7 (9·5%)	25 (34%)
Other series: Jones and Alexander	70	43 (61·4%)	1 (1·4%)	3 (4·3%)	23 (32·9%)
Söderhjelm	112	33 (29·5%)	15 (13·4%)	3 (2·7%)	61 (54·4%)

a = Total empyema. b = Partial empyema.

Table V gives the overall results of all patients presented to a surgical department. Comparison with other published series is instructive. Jones and Alexander maintained that thoracoplasty was the standard treatment for a tuberculous empyema unless there were contraindications, while Söderhjelm (1945) is prejudiced against surgical measures because of initial unfavourable experiences, and his cases were therefore treated medically in the main.

The "cured" and "improved" cases are taken together in Table VI and the percentage of satisfactory results compared in the four groups. It will be seen that Jones and

TABLE VI.—*Cured and Improved*

Group	Jones and Alexander	Ulleval	Söderhjelm
I }	(15) 71%	(1) 100% }	(22) 67%
II }		(8) 62·5% }	
III	(25) 68%	(35) 71%	(52) 46%
IV	(30) 40%	(30) 36%	(38) 16%
Total	(70) 62·8%	(74) 56·5%	(112) 42·9%

No. of cases in brackets.

Alexander's series is closely comparable with the Ulleval series.

Söderhjelm's series is comparable in Groups I and II where there is no active lung disease, but in Groups III and IV the results fall below the other two series (and especially so in Group IV). Söderhjelm concludes by stating that better results could have been achieved by surgical measures in Groups III and IV (Groups II and III in his article). Table VI gives strong support to the view, now fairly generally accepted, that the treatment of a tuberculous empyema is surgical if medical measures do not cure it in the short time after its inception when it is amenable to these measures. How long that interval should be will be considered later.

The main interest centres in the results of those of our cases which were submitted to thoracoplasty (Table VII).

TABLE VII.—*Results of Thoracoplasty for Tuberculous Empyema*

Group	No.	Cured	Improved	Unimproved	Died
I a	1	1			
I b	—	—			
II a	3	2			1
II b	4	3			1
III a	28	13*	10	1	4
III b	4	1	1	1	1
IV a	11	6	1		4
IV b	4	2	1		1
Total	55	28 (51%)	13 (23·5%)	2 (3·5%)	12 (22%)
		74·5% satisfactory			
Jones and Alexander	45	36 (80%)	1 (2·2%)	1 (2·2%)	7 (15·5%)
		82·2% satisfactory			

a = Total empyema. b = Partial empyema.

* Includes one patient cured of empyema who died two years later of tuberculosis of the opposite lung.

It will be seen that about 75% of all patients admitted to the department were treated surgically, and of these 51% were cured and 23.5% improved, giving a satisfactory result in 74.5% of operated cases. In those cases in Group IV (with secondary infection) which reached the hospital in a condition that permitted operation the result was surprisingly good. This can be correlated with the good results obtained in a similar group by Harbitz (1946) by repeated small operations—11 (70%) cured and improved out of 16.

Unoperated Cases

The results of the 19 unoperated cases are shown in Table VIII. These cases do not of course in any way give grounds for judging non-surgical methods. The judgment of results that can be obtained by non-surgical measures must come from a series treated from the incipient stage

TABLE VIII.—*Results in 19 Unoperated Cases*

Cured (penicillin)	1 (local empyema)
Improved (penicillin) ..	1 (local cure; tuberculous spondylitis)
Unimproved	3 (2 discharging sinuses; 1 active tuberculosis and local disease)
Died	14

at the sanatorium or clinic where A.P. treatment is carried out. These cases came to the surgeon too late with either uncontrolled pulmonary disease or acute secondary infection, with great toxicity or occasionally amyloid disease in association with a chronic discharging fistula. Nine of these cases were drained, but the general condition did not allow further treatment in spite of the administration of penicillin and sulphonamides. Two were treated by puncture and penicillin instillations and the local disease was cured, but one of these had a tuberculous spondylitis, so only one out of the whole series was finally cured.

The Time Factor

A period of six months from the estimated time of the onset of the empyema was chosen as an arbitrary dividing line, and the cases were divided into groups according to

TABLE IX.—*Time Relationship*

	No.	Cured	Improved	Died
Early cases (within 6 months) ..	24	16	4*	4
Late cases (after 6 months ..	31	12	9†	10

* 1 superficial wall fistula; 1 recent op. fistula; 1 connected bronchus.
† 3 fistulae; 1 cold abscess in wall (late).

whether or not they came to the surgeon within this time. The results are shown in Table IX; they appear to be significant, and indicate that cases should be operated upon within six months of the onset.

In the early group there are three fistulae cases among the improved cases. One was investigated by contrast radiography, and shown to have a superficial "collar-stud" abscess of the chest not related to the empyema cavity; another fistula was very small and related to a bronchial fistula, in a case operated on one year previously. The third was operated upon about eight months before.

In the late group there are three definite fistulae from the empyema cavity,* and in one patient a subcutaneous cold abscess was presumed to be related to the empyema cavity. There is therefore a somewhat higher proportion of long-standing fistulae after late operations. The number of fistulae is small compared with some other series, and a possible explanation of this lies in the use of apicolysis.

*These three cases are among the six in which a follow-up was not completed, but a fistula was present when last observed.

Out of 35 cases of total empyema operated upon, an apicolysis to a larger or smaller extent was done in 25, as this is the only mechanical means of collapsing the pleural space at the apex. If this is not done there is often a very long sinus extending over the top and medially to the mediastinal surface. The procedure of apicolysis is, however, attended with risk, especially if there is secondary infection.

It is clear that the longer an empyema cavity remains untreated the thicker the pleural walls become, until at last they may be calcified and absolutely rigid. Collapse of the chest wall by a standard thoracoplasty then fails to close the rigid cavity completely, and it is mainly in such late cases that the more deforming and also dangerous operations involving the opening of the chronic pleural cavity are necessary, with removal of all or a part of the stiffened tissues. In this series 10 operations of the Schede and Roberts type have been performed, with three deaths and two residual fistulae. Most of these cases had had empyemas for several years before operation.

In this series there were four proved cases of stenosis with atelectasis and three cases of atelectasis without any bronchoscopic evidence of stenosis. The effect on aetiology is clear, as the lung cannot expand after pneumothorax, and the large pleural cavity is practically certain to become infected if allowed to remain; but it is also of interest to note the effect on the extent of the operation. Of the seven cases, six had total or subtotal thoracoplasty in several stages and one patient died after the first stage. A bronchial stenosis is therefore an absolute contraindication to a pneumothorax, being attended with a high risk of subsequent empyema.

In general, also, the older the empyema the more ribs have to be removed in the standard extrapleural thoracoplasty to close the cavity.

It is not the case, as is sometimes thought, that all operations for empyemas need to be total or subtotal thoracoplasties. Of the 55 operated cases (after excluding the four limited operations for partial empyemas) there were 17 in which seven or fewer than seven ribs had been removed at the completion of the different stages. In nine of these, only four or five ribs were removed, an operation with a negligible deforming effect. These 17 cases were again considered in relation to whether they were operated upon within six months of the onset or after this period. The results are seen in Table X.

TABLE X.—*Limited Thoracoplasties and Results as regards Empyema (17 Cases)*

	No.	Cured	Improved
Operation under 6 months	9	8	1 (early residual fluid)
Operation after 6 months	8	3	5 { 3 residual fluid: 6 years, 1 year, recent operation. 2 fistulae

In the cured cases the late result showed the lung expanded out to the chest wall below the level of the rib resections with no pleural thickening or fluid. The difference in the results in relation to time suggests that a limited operation is fully justified in early cases, but is not invariably successful in cases operated upon after six months, where a larger thoracoplasty is indicated.

If the problem is regarded from a physiological-pathological point of view it is clear that the pleura in the early stage, although infected, is still a functional membrane able to absorb the effusion if there is no reinfection and if the cavity can be obliterated as absorption proceeds.

The second of these objects can be achieved in some cases by the physician stopping the A.P. and aiding the expansion of the lung by aspiration (if this is not prevented by a fistula, stenosis, or pleural thickening. In these cases that are dealt with early, and where the lung can be allowed to expand, the early or incipient empyema can be averted. This explains the fairly good results obtained by medical measures in Groups I and II, and also in early Group III cases.

The moderately satisfactory results obtained by conservative measures are often at the expense of the temporary collapse of the lung, usually before its re-expansion would otherwise be indicated. In some cases a cavity will still be present in the lung, and in others it may reappear when temporary collapse treatment is given up. In such cases, when the "cold abscess" of the pleura has been obliterated, it will then be necessary for the physician to refer the patient for a thoracoplasty to control the disease. Provided this is recognized, there is good ground for medical treatment of an early empyema in the first two to three months, for it is preferable to do a thoracoplasty with a closed pleural space; but there are no grounds for regarding the conservative methods of treatment as an alternative to surgery, except in those cases in which the lung does not require further collapse therapy. Delay after three months is unlikely to result in closure of the empyema cavity by conservative measures, and is disadvantageous to the patient who loses the advantage of probable cure by a limited thoracoplasty, and is exposed to the serious risk of secondary infection.

The problem of progressive exudates has had considerable light thrown upon it by the experience of Rogstad (1948) at Vardasen Sanatorium. During the years 1941–7, 1,044 A.P.s were induced in 918 patients. Of these, 169 (16%) had tuberculous effusions which were tapped for various reasons, such as long-continued fever, increasing exudate with dyspnoea, anorexia, or deterioration of general condition. The great majority of cases with A.P. at some time or another had some degree of exudate which did not require tapping, and are excluded from the figures.

Of the 169 progressive exudates 59 developed definite purulent empyemas in spite of treatment. About one-quarter of the exudate cases continued with a satisfactory A.P., while in three-quarters (including the empyemas) the A.P. had to be abandoned because of pleural thickening and diminution of lung function. The view taken, therefore, at the end of the period was that in every case of progressive tuberculous exudate which did not respond favourably to two or three tappings the A.P. was abandoned and an attempt made to get the lung out to the chest wall by aspiration of fluid and exsufflation of air. If this did not succeed in the course of two to three months the case was regarded an "incipent empyema" and the surgeon consulted as regards thoracoplasty.

Five such cases in which the effusion was not purulent are included in the present series, with cure following a 5–6-rib thoracoplasty. Probably this deals primarily with the underlying lung focus, preventing reinfection, and the effusion is then completely absorbed after the size of the cavity has been reduced by operation.

Table XI shows the causes of death in the operated series as a whole. The post-operative mortality rate of 18% is high, but it reflects the danger of an extensive operation outside an infected cavity. All the deaths occurred in patients in whom the empyema was over six months old or was secondarily infected, except for the one patient who died of tuberculosis of the opposite lung two years later, the empyema and underlying lung being healed. The implications of this do not need repetition.

TABLE XI.—*Unimproved Cases and Causes of Death in Operated Series (55 Cases)*

Group	No.	Unimproved	Died	
			Post-operative Due to Empyema	Due to Lung, etc.
II	2		2 (shock; mitral stenosis)	
III	8 (all except 1 over 6 months)	2 (lung disease)	4 (2 infection; 1 shock; 1 amyloid—late)	2
IV	5		4 (3 infection (2 perforated pleura); 1 shock)	1
	15	2	10	3

Operative mortality = 18%.

Conclusion

Finally, I would like to stress the aetiological relationship between A.P. treatment and empyema mortality. The recorded incidence of empyema in A.P. treatment is very variable, and depends partly on the differences in treatment and partly on different definitions of an "empyema." Alexander (1937) quotes figures ranging from *nil* (Ulrici, 600 cases) to 21% (Hays, 151 cases). Frostad, in Norway, has estimated it at 10%, as an average figure, and in Söderhjelm's series it was given as "only 7.5%."

A consistent large series from one centre is available at Vardasen (Rogstad, 1948). Great care is taken in the selection of cases and in the technique of closed internal pneumolysis, the director undertaking them all himself. The empyema incidence there is only 6.4% (59 out of 918 patients). An attempt has been made to distinguish in the series between mortality due primarily to the empyema and that due to the spread of the tuberculous disease. So far as could be judged, death was due primarily to the empyema in 16 cases, or 1.7% of all those in whom an A.P. was induced. This not inconsiderable mortality is therefore due to the A.P. as a method of treatment, and should be borne in mind when the induction of a pneumothorax is being considered and weighed against the other methods of collapse of the lung. In certain cases the destruction and fibrosis of the lung indicate the need for a primary permanent method of collapse, such as that of thoracoplasty. It is certainly incorrect to induce an A.P. first in practically every case, as is sometimes done on the grounds that it is an easy and safe method of treatment and therefore should be given a trial.

The misleading factor about the risk of an A.P. (empyema being only one, although perhaps the worst, of the complications) is that the risk is spread over such a long period of time that it sometimes fails to impress itself sufficiently on the mind.

Summary

The results in a series of 74 cases of tuberculous empyema are discussed and analysed.

A staged thoracoplasty is the standard method of treatment used in all cases when the general condition permits, supplemented by a Schede and Roberts type of operation in a few, mostly chronic, cases. It should be carried out within six months of the onset of the empyema.

In cases without secondary infection and operated upon within six months, a limited thoracoplasty (up to seven ribs) is often satisfactory.

The treatment of progressive tuberculous pleurisy is discussed; if it does not respond to medical measures in about three months it is regarded as an "incipient empyema," best treated by a limited thoracoplasty.

The risk of the development of a tuberculous empyema with resulting mortality following A.P. treatment is discussed.

I would like to express my sincere thanks to Dr. Carl Semb for his personal kindness during a period of eight months spent in his department, and for suggesting the investigation. I would also like to thank the other members of the medical staff of Ulleval Hospital and Dr. Tuxen and others at Vardasen Sanatorium for their unfailing courtesy and friendliness; and, lastly, Sisters Halldis and Krohg without whose willing aid the investigation would not have been possible.

REFERENCES

Alexander, J. (1937). *Collapse Therapy of Pulmonary Tuberculosis.* Springfield, Ill.
Harbitz, H. F. (1946). *Nord. Med.*, **30**, 1314.
Hedblom, C. A. (1932). *Acta chir. scand.*, **71**, 311.
Rogstad, K. (1948). Tuberculous Empyema Pleurae seen from the Sanatorium Point of View. Paper read at meeting of Norwegian Tuberculosis Association, May, 1948.
Söderhjelm, L. (1945). *Nord. Med.*, **28**, 2337.

PENICILLIN IN THE TREATMENT OF INFLUENZAL MENINGITIS

BY

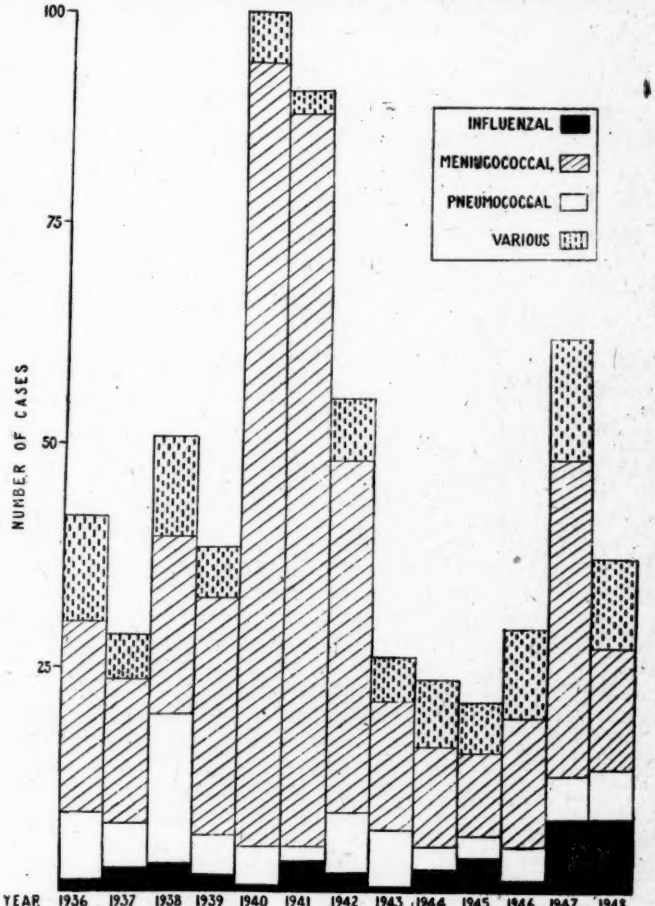
FRANCES BRAID, M.D., F.R.C.P.

AND

RICHARD B. MEYER, M.B., M.R.C.P.

(*From the Children's Hospital, United Hospitals Group, Birmingham*)

The incidence of influenzal meningitis has increased recently (see the accompanying Chart) and the mortality from the disease has fallen very considerably with the use of sulphonamides, Pittman type b specific rabbit antiserum, penicillin, and streptomycin. There is, however, at present no absolute answer to what is the best line of treatment to adopt.



Yearly incidence of cases of suppurative meningitis in the Children's Hospital, Birmingham

Previous to the introduction of the sulphonamides, influenzal meningitis was usually fatal. With the use of sulphonamides alone the position was improved a little, but in America a big advance was made by Alexander's (1944) combined treatment with sulphadiazine and Pittman type b specific rabbit antiserum. Using this method she had 68 recoveries in a series of 87 cases. In this country, however, specific antiserum has not been freely available, and the main advance has been made with the use of sulphonamides and with penicillin. Gordon, Woodcock, and Zinnemann (1944) review reports of cases treated with sulphonamides and discuss the response to treatment in relation to the type of organism involved. They record two cases, due to strains not belonging to Pittman type b, which responded to sulphapyridine, and three cases, due to type b, of which only one responded to sulphapyridine. They conclude that prognosis and treatment depend primarily on the strain of the infecting organism. Gordon and Zinnemann (1945) tested the sensitivity of various strains of *H. influenzae* to penicillin and found that 31 of 48 respiratory strains were inhibited by concentrations of 2.5 units per ml. of medium, and 16 out of 18 strains isolated from cerebrospinal fluid were similarly inhibited. They conclude that *H. influenzae* strains are not insensitive to penicillin though the sensitivity is much lower than that of staphylococcal and streptococcal strains. Zinnemann (1946) surveys 20 cases of influenzal meningitis in relation to bacterial types. Of these, 19 were caused by type b. Of five treated with sulphonamides one recovered, while of 15 treated with sulphonamides and penicillin eight recovered. McIntosh and Drysdale (1945) report the case of a child aged 2½ years who developed *H. influenzae* meningitis (organism, Pittman type b) during convalescence from meningococcal meningitis and who recovered on treatment with penicillin and sulphamezathine. Drysdale, McIntosh, and Brodie (1946) report recovery in a second case, that of a child of 20 months, treated with penicillin. In this case the organism (Pittman type b) was sensitive to penicillin but insensitive to sulphonamides. Forgacs, Hutchinson, and Rewell (1945) recommend that influenzal meningitis should be treated with a combination of penicillin and a sulphonamide, and report two cases, of which one recovered. Thomson, Bruce, and Green (1947) put on record four cases, of which three recovered; they advocate the use of intramuscular penicillin and an oral sulphonamide along with the intrathecal administration of 50,000 units of penicillin daily until the temperature has been normal for seven days. Gottlieb and Forsyth (1947) report four cases in infants, three of whom recovered on treatment with sulphadiazine by mouth and penicillin given intramuscularly and intrathecally. The strain of *H. influenzae* recovered from the cerebrospinal fluid was found to be insensitive to 10 units of penicillin per ml. of medium but sensitive to 100 units per ml. This justified their use of very large doses of penicillin, and they consider that high systemic dosage is essential in order to prevent relapses due to reinfection of the meninges. They recommend that 20,000–40,000 units should be given intrathecally daily and 120,000 units intramuscularly at three-hourly intervals.

More recently, reports have been made on the value of streptomycin. In the American literature Hoyne and Brown (1948) record 28 cases with only two deaths. All were given sulphadiazine, and in addition some received serum, some had serum and streptomycin, and some (17) had streptomycin. Twenty of the 26 who recovered had no intrathecal therapy, among them being 10 who received oral sulphadiazine and intramuscular streptomycin. These authors consider that not only is intrathecal therapy unnecessary but that it prolongs the time required for recovery.

Case	Age in Years	Sex	No. of Days Ill Before Admission	Cerebrospinal Fluid—First Examination					Penicillin Units (Thousands) Daily × No. of Days		Sulphadiazine Daily Dose × No. of Days	Result
				Cells per c.mm.	Sugar (mg./100 ml.)	Protein (mg./100 ml.)	Organism Seen	Organism Cultured	I.M.	I.T.		
1	1 3/12	F	2	2,610	0	50	+	+	80 × 2 240 × 29	20 × 6 40 × 7	83·5 g. × 29	Cured
2	1	F	8	215	0	90	+	+	80 × 37	40 × 12	50 g. × 21	Died after 36 days
3	7/12	F	14–21	1,000	0	340	+	0	64 × 4 240 × 28	10 × 11 20 × 2	69 g. × 27	Alive M.D.
4	1 3/12	F	3	577	0	120	+	+	320 × 17 Clinical evidence of recurrence of meningitis 800 × 14 1,200 × 5	40 × 8 60 × 6	105 g. × 36	Cured
5	2	F	5	80,000	—	—	+	+	400 × 2	40 × 2	4 g. × 1	Died within 48 hours
6	4½	M	1	5,600 7	0 83	200 15	+ (6 months later)	+	960 × 21	40 × 5	32 g. × 10	Cured
7	1 5/12	M	1	2,100	0	160	+	+	960 × 20	40 × 10 Omit 4 days 40 × 4 (Probably unnec.)	67 g. × 16	„
8	5	M	1	12,800 150 50	0 44 22	350 35 25	+ (43rd day) (3 months later)	+	960 × 23	40 × 16	112 g. × 20	„
9	2	F	2	14,000	11	100	+	0	480 × 1 960 × 10 480 × 9	40 × 8 Convulsion after 5th dose	60 g. × 15	„
10	1 9/12	M	14	1,400	33	30	+ (On 19th day in hospital)	+	320 × 5 Omit for 2 wks 960 × 12	40 × 4	52 g. × 14	„
11	2½	M	1	7,500	0	240	+	0	100—1 dose	40 × 1	2 g.	Died in 4 hours
12	10/12	M	10	380 80 white 590 red	0 35	55 (On 4th day of treatment)	+	0	120 × 2 320 × 14 Streptomycin given also from 9th day	40 × 3 Convulsion after 3rd dose	79 g. × 18	Cured
13	2½	M	6	2,540 70	21 30·5	90 35	+ (On 5th day of treatment)	0	480 × 4 Then given streptomycin	40 × 4	96 g. × 24	„
14	6	M	3	6,000	41	200	+	+	400 × 1 Then streptomycin	40 × 1	8 g. × 7	„
15	1 5/12	F	7	5,000	82	186	+	+	Streptomycin		40 g. × 9	„

Organism typed in 3 cases only—Type b.

In a report in the *American Journal of Diseases of Children* (1948) of a discussion (in the Transactions of the American Pediatric Society) on the value of streptomycin Alexander states that the use of streptomycin alone in the treatment of influenzal meningitis led to complete recovery when the infection was mild or of average severity; when the infection was severe the result was disappointing, the chief cause of failure being the development of resistance by the organism. In the same discussion Weech reported that he had found Pittman type b to be just as susceptible to penicillin as to streptomycin, while Hodes found that each of 12 strains isolated from patients suffering from influenzal meningitis was more susceptible to penicillin than to streptomycin.

In this country Wilson (1948), in a summary of a report to the Medical Research Council on the use of streptomycin in influenzal meningitis, states that the principal cause of failure was the development of resistance by the organism; this occurred in seven out of nine failures, the sensitivity changing from 0.5 unit to as high as 5,000 units in one to four days. This development of resistance is a serious drawback, and Wilson remarks that "it has been decided in future trials to use a combination of streptomycin, penicillin, and sulphonamides from the start." Smythe (1948) reports 12 cases treated with streptomycin, 10 of which had received previous treatment with penicillin and sulphadiazine. In all of these cases the preliminary dosage of penicillin was not high. He concluded that "streptomycin gave good results in mild and moderately severe cases but was unsatisfactory in three severe cases." Roscoe and Gleeson-White (1948) report four cases treated with streptomycin. In their one fatal case the organism was resistant to streptomycin, and in one of their successful cases the infection was first controlled with intramuscular penicillin, 100,000 units followed by 50,000 units three-hourly for two days and then 25,000 units four-hourly. Relapse occurred on the 15th day, and this was controlled by streptomycin. In the light of the experience of Gottlieb and Forsyth and of our own experience we do not consider that this case indicates a failure of penicillin to cure the disease but that it emphasizes the need for continued high dosage. It is to this point that we particularly wish to draw attention.

Report of 15 Cases

Fifteen cases of influenzal meningitis were treated in the Birmingham Children's Hospital. Two were admitted at the end of 1946, two in March, 1947, and 11 between November, 1947, and July, 1948. Six in the last group were under our care, and for permission to include the other cases in this report we are indebted to our colleagues. Case 1 has already been reported (Gerard, 1947). Twelve of the 15 children are alive, and all are quite well with one exception (Case 3), who is spastic and mentally defective. Details of the cases are summarized in the Table and reports are given below. The incidence of influenzal meningitis among admissions to the hospital is shown in the Chart.

Types of Cases

An evaluation of any line of therapy must take into account the age of the patient, the initial severity of the infection, and the duration of the illness before treatment is begun. It is well established that the mortality is highest in infants. The initial severity can be estimated roughly by the rate of progress to a comatose state, but, apart from that, clinical signs are of uncertain value; chief among laboratory tests is the amount of reducing substance in the cerebrospinal fluid.

Age.—Of the patients whose cases are here recorded two were under 1 year, eight were between 1 and 2 years, four were between 2 and 5 years, and one was over 5 years.

Initial Severity and Duration of Illness

Severe Type.—Cases 6, 7, 8, and 11 were admitted within 24 hours of the onset of illness, and all were comatose or semicomatose. In the cerebrospinal fluid the cell count was high—2,000–12,000 per c.mm.—and no sugar was present. Three of these patients recovered, and one (Case 11) died within four hours of admission. Cases 1, 4, 9, and 14 were admitted on the second or third day of the illness and were comatose or semicomatose; the cell count in the cerebrospinal fluid was 577–4,000, and sugar was present in two; all recovered. Case 2, aged 1 year, was admitted to hospital on the eighth day of her illness, during the first four days of which "she could not be roused"; she died five weeks after admission. A second (Case 3), aged 7 months, had been ill for two to three weeks and had "seemed far away" for two weeks; she survived, but with permanent cerebral damage. A third (Case 5), aged 2 years, was admitted on the fifth day of illness and died two days later. These three cases draw attention to the difficulty in diagnosing meningitis in very young children and emphasize the disaster consequent on delay in starting adequate treatment.

Less Severe Type.—Case 12, aged 10 months, was admitted on the 10th day of illness; he appeared to have pain in the head, and resisted flexion of the neck, but he was "lively and active." In the cerebrospinal fluid the cell count was 380, sugar was absent, and the protein was 55 mg. per 100 ml. Case 10, aged 1 year 9 months, had been ill for two weeks before admission and was actually under observation in hospital for nearly three weeks before meningeal signs appeared; after some improvement on treatment with relatively small doses of penicillin for pyrexia of unknown origin, a sudden rise in temperature on the 17th day induced us to have a second blood culture, the first, on his admission to hospital, having proved to be sterile. A pure growth of *H. influenzae* was obtained. Lumbar puncture was carried out on the 19th day, neck rigidity having appeared; the fluid contained 1,400 cells, 33 mg. sugar, and 30 mg. protein per 100 ml.; *H. influenzae* was cultured. These two cases demonstrate the long bacteriaemic phase which may precede the meningeal phase; in neither case was the meningitis severe, and both patients recovered.

Treatment and Results

The line of treatment adopted has varied somewhat according to the physician responsible for the case and according to experience gained. That and the results obtained will be discussed under three headings.

1. *Sulphadiazine and Penicillin (11 cases)*

(*a*) Three of these patients died. One (Case 11), aged 2½ years, admitted in coma after 24 hours' illness, died before more than one dose of penicillin had been given. Another (Case 2), aged 1 year, had a severe infection and had been ill for eight days; she was comatose on admission. She was given intrathecal penicillin, 40,000 units daily for 12 days, and intramuscular penicillin, 10,000 units three-hourly for 36 days. Irreparable damage may have been done during the eight days before admission, but in any event the intramuscular dose was inadequate. She died on the 36th day of treatment. The third (Case 5) was semicomatose on admission, after having been ill for five days; she was given one dose of 40,000 units of penicillin intrathecally and 50,000 units three-hourly intramuscularly. This dosage we regard as inadequate. She died within 48 hours of admission.

(*b*) One (Case 3) recovered, but had received permanent cerebral damage. She was 7 months old, and had been ill for two to three weeks before admission. Again irreparable damage may have already been done, but doses of only 10,000 units were given intrathecally and 8,000 units, later increased to 30,000 units three-hourly, intramuscularly.

(*c*) Seven cases recovered completely. Six of them were of the severe type, comatose or semicomatose on admission; three were admitted within 24 hours of the onset of illness and three within two to three days; the seventh case had a long bacteriaemic phase and the meningitis was not severe. Case 1 (Gerard, 1947), the first in the series, had a relatively low intramuscular dosage over a period of four weeks and required

intracisternal as well as intraventricular penicillin. Case 4 had 40,000 units of penicillin intrathecally for eight days and intramuscular penicillin, 320,000 units daily, for 17 days. After an immediate good response there was a recurrence of meningitis at the end of the third week, and this was controlled completely by much larger dosage. Cases 6, 7, 8, and 9 were given 40,000 units intrathecally daily and 960,000 units intramuscularly in three-hourly doses. In no case was there any evidence of meningeal reinfection after the illness was once under control, and in no case was intracisternal or intraventricular therapy required. In one case a severe convulsion occurred after the fifth intrathecal injection, but with no ultimate ill effect.

In this last group the cerebrospinal fluid became sterile on the third to fifth day, clinical improvement was apparent in two to three days, and the meningitis seemed to be well under control by the end of a week, though the temperature did not settle completely so long as intramuscular penicillin was given. Also the cell count in the cerebrospinal fluid did not return to normal while the patient was under treatment. This was presumably due to reaction to the penicillin, but in those patients whose C.S.F. has been examined several months after cessation of treatment an ultimate return to normal is indicated. The persistence of pyrexia and cellular reaction, however, made it difficult to decide when to stop treatment: we may have given an unnecessary amount of intrathecal penicillin. There seems to be no need to continue this for more than a week after the fluid is sterile, provided adequate intramuscular penicillin, 960,000 units daily, is continued for about three weeks.

2. *Sulphadiazine, Penicillin, and Streptomycin (3 cases).*—In Cases 12 and 13 a change was made from penicillin to streptomycin on the fourth and fifth day respectively, but in each case improvement in the C.S.F.—a fall in cells from 380 to 80 and a rise in sugar from 0 to 35 mg. per 100 ml. in one, and a fall in cells from 2,540 to 70 and a rise in sugar from 21 mg. to 30.5 mg. per 100 ml. in the other—had already taken place. The second patient had a convulsion after one of the intrathecal injections of penicillin. In the third (Case 14), a change to streptomycin was made on the second day of treatment. In none of these cases can it be said that penicillin had failed: it had not been given time to succeed. All recovered.

3. *Sulphadiazine and Streptomycin.*—One patient (Case 15) was treated with this combination with complete success.

Conclusion

We submit that these cases show that penicillin, combined with oral sulphadiazine, given in adequate dosage—960,000 units daily for three weeks in three-hourly doses intramuscularly, and 40,000 units daily intrathecally for about seven days after the cerebrospinal fluid is sterile—provides an effective remedy in the treatment of severe as well as of moderately severe cases of influenzal meningitis. The facts that streptomycin is not freely available at present and that the organism is known to develop resistance render streptomycin less generally useful.

We wish to express thanks to our colleagues for permission to include their cases in this survey, to the resident medical staff for their help in carrying out the treatment, and to the nursing staff for their great care of the patients. We are also indebted to Dr. Rogers for the pathological reports and to Miss E. Hickmans for the biochemical reports.

REFERENCES

Alexander, H. E. (1944). *J. Paediat.*, **25**, 517.
—— (1948). *Amer. J. Dis. Child.*, **75**, 428.
Drysdale, C. F., McIntosh, D. G., and Brodie, J. (1946). *British Medical Journal*, **2**, 223.
Forgacs, P., Hutchinson, R. I., and Rewell, R. E. (1945). *Lancet*, **1**, 785.
Gerard, J. (1947). Ibid., **2**, 167.
Gordon, J., Woodcock, H. E. de C., and Zinnemann, K. (1944). *British Medical Journal*, **1**, 779.
Gordon, M., and Zinnemann, K. (1945). Ibid., **2**, 795.
Gottlieb, B., and Forsyth, C. C. (1947). *Lancet*, **2**, 164.
Hoyne, A. L., and Brown, R. H. (1948). *J. Amer. med. Ass.*, **136**, 597.
McIntosh, D. G., and Drysdale, C. F. (1945). *British Medical Journal*, **2**, 796.
Roscoe, J. D., and Gleeson-White, M. H. (1948). *Lancet*, **2**, 885.
Smythe, P. M. (1948). Ibid., **2**, 485.
Thomson, J., Bruce, L. M., and Green, M. G. (1947). *British Medical Journal*, **2**, 414.
Wilson, C. (1948). Ibid., **2**, 552.
Zinnemann, K. (1946). Ibid., **2**, 931.

A STUDY OF THE POST-WAR INCIDENCE OF BREAST-FEEDING

BY

F. H. M. DUMMER, M.B., Ch.B., D.P.H.
Assistant County Medical Officer, Hertfordshire; Maternity and Child Welfare Medical Officer, Hitchin and Stevenage

This investigation was carried out in order (1) to study the real incidence of breast-feeding in the town of Hitchin, North Hertfordshire (population 20,710); (2) to analyse the reasons for early weaning; and (3) to consider any existing correlation of age and parity, place of confinement, effect of vitamin supplements, mixed feeding, and housing.

Opinions of previous investigators have varied considerably on the trend in breast-feeding. Spence (1938) reported a definite decline; Robinson (1939) stressed the tendency towards a shortening of the duration; Hughes (1942), reviewing the incidence of breast-feeding in a small mining community, found that 31% of babies were weaned by the second week. It has recently been stated that not more than half the babies in Britain are breast-fed for longer than three months (Waller, 1947).

Material and Method

The survey was restricted to mothers living in Hitchin who were confined locally between Jan. 1, 1946, and Dec. 31, 1947, and who spent at least six antenatal months in the district. By such selection it was hoped that variations in antenatal and post-natal care, modes of management in infant-feeding, and fluctuations in the availability of extra rationed goods would be equalized.

In order to obtain a comprehensive survey it was obvious that the records of antenatal and infant welfare clinics alone would be inadequate. A detailed questionary was therefore prepared and mothers in the above category were interviewed individually. The questions were worded so that a "social history" of each infant could be built up. A complete picture of environmental conditions possibly affecting its intrauterine and extrauterine life until the age of 6–9 months was obtained. Out of all the visits paid, in only one instance was the required information refused.

The results of the questionary, taken in conjunction with the relevant records in the clinics and the reports of the health visitors, provide the basis of this study.

Results

Omitting infant deaths, removals from the district, and mothers who were confined elsewhere, the total available for investigation was 546. The number successfully interviewed was 545. Of these, 58.7% were in regular attendance at the infant welfare centre. This figure is regarded as satisfactory, since over 30% of mothers with children born in 1946–7 are living in an area of the town almost two miles from the centre, and their regular attendance would be a matter of great inconvenience to them.

Deliveries.—These were carried out in the County Council Maternity Home (161), two private nursing-homes (230), the

maternity unit of a local hospital (50), and "on district" (104). Midwives delivered 383 cases, while 162 were doctors' cases. The overall average period "confined to bed" was 11.1 days.

Age and Parity.—Almost one-quarter of the primiparae were aged 30 or over (Table I). Although the number of primiparae is high—44%—the tendency towards postponement of the first birth is seen. The average time which elapsed between marriage and the birth of the first child to *the primiparous group* was 3.4 years. Less than 27% have more than two children.

TABLE I.—*Age and Parity*

Age	Para									Total
	1	2	3	4	5	6	7	8	8+	
18–	26	2	1							29
22–	87	25	6	1		1				120
26–	72	38	12	7	2	1				132
30–	38	48	18	11	6	3	1			125
34–	14	31	15	8	5	3	4	1		81
38–	5	11	14	8	6	4	2	2	1	53
42+		2			1		1		1	5
Total	242	157	66	35	20	12	8	3	2	545

Duration of Breast-feeding.—In Table II "weaned" is defined as "having reached the stage at which the infant receives wholly, for the first time, feeds other than breast milk." These results are compared with those of previous investigations

TABLE II.—*Duration of Breast-feeding (545 Cases)*

Time	Complete Breast-feeding	Partial Breast-feeding	Weaned
At birth	84·8%	5·5%	9·7%
Up to 2 weeks	78·3%	2·4%	19·3%
1 month	69·5%	4·5%	26·0%
2 months	57·5%	6·5%	36·0%
3 ,,	50·3%	2·7%	47·0%
4 ,,	40·7%	5·3%	54·0%
5 ,,	30·25%	9·0%	60·75%
6 ,,	13·2%	18·4%	68·4%

TABLE III.—*Duration of Breast-feeding. Comparison with Previous Investigations*

Time	Spence (from Findlay, Edinburgh), 1938 (3,000 Cases)	Spence (from Brewis, Newcastle) 1938 (1,326 Cases)	Robinson, Liverpool, 1937 (439 Cases)	Hughes, Newbiggin, 1942 (112 Cases)	Present Survey 1948 (545 Cases)
10–14 days	87%	—	—	—	—
2 weeks	—	—	86%	67%	78·3%
1 month	—	—	—	55%	69·5%
3 months	—	58%	48%	32%	50·3%
3–6 ,,	55%	—	—	—	—
6 ,,	—	34·7%	29%	19%	13·2%

(Table III). Since the factor of "duration" is of greater consequence than "initial incidence" the results were further broken down to ascertain the trend of primiparous women (Table IV).

TABLE IV.—*Duration of Breast-feeding: Primiparae (242 Cases)*

Time	Complete Breast-feeding	Partial Breast-feeding	Weaned
Up to 2 weeks	75%	9%	16%
1 month	66%	11·5%	22·5%
3 months	50%	4·2%	45·8%
6 ,,	12·8%	18·2%	69%

Complementary Feeding.—Table V shows the average period for which mothers have been able to extend breast-feeding by the use of complementary feeds. Cases in which full breast-feeding was later resumed have been excluded.

TABLE V.—*Showing the Duration of Breast-feeding along with Complementary Feeds*

Complemented at	Average Extension of Breast-feeding	Complemented at	Average Extension of Breast-feeding
1 week	3·5 weeks	8 weeks	6·9 weeks
2 weeks	5·3 ,,	12 ,,	10·0 ,,
3 ,,	7·3 ,,	16 ,,	9·1 ,,
4 ,,	6·0 ,,	18 ,,	9·8 ,,
5 ,,	7·3 ,,	20 ,,	11·9 ,,
6 ,,	6·6 ,,	22 ,,	10 ,,

Place of Confinement Related to Weaning.—The results are shown in Table VI.

TABLE VI.—*Percentages Weaned at 14 Days and 3 Months Referred to Place of Confinement*

Place of Delivery	Weaned by 14 Days	Weaned by 3 Months
County Council Maternity Home	16·2%	53·4%
Private nursing-homes	18·2%	42·2%
District	23·1%	50%

Housing.—Details of housing accommodation for the first six post-natal months were carefully noted, and cases were allocated to one of the six categories shown in Table VIII. The special position of primiparae was ascertained.

TABLE VII.—*Showing (i) Housing Distribution; (ii) Percentage Weaned by 8 Weeks; (iii) Percentage of Primiparae Weaned by 8 Weeks*

Group	Sharing	Detached	Semi-det.	Flat	Rooms	In-laws
(i) Overall	8·1%	7·2%	48·5%	9·1%	11·7%	15·4%
(ii) Weaned by 8 weeks	25·0%	26·6%	33·4%	31·2%	39·6%	40·0%
(iii) Weaned by 8 weeks (primiparae)	63%	20·0%	29·0%	27·0%	59·0%	65·0%

Vitamin Supplements.—It might be of some interest to note the percentages using the Ministry of Food vitamin supplements A and D and the concentrate of orange juice available for expectant mothers: (1) 27.3% did not use the supplements at any time; (2) 11.8% took the supplements in both antenatal and post-natal periods; and (3) 60.9% took them in the antenatal period only. For either period the minimum time allowed in the calculations was one month and the maximum six months. In group 1, 25.1% breast-fed for three months or more; in group 2 the figure was 12.3%; and in group 3, 62.6%. No real relationship is suggested in these findings.

Reasons for Weaning.—The reasons for weaning by the end of the third month were: maternal illness, general, 9%; maternal illness, local, 15%; illness of infant, 5%; economic, 4%; psychological, 10%; physiological, 51%; miscellaneous, 6%. Among the above causes breast abscess accounted for 4%, mastitis or engorgement without abscess formation 6%, malformation of nipples or breasts 5%, and infant malformations such as cleft-palate and hare-lip 1.1%.

Occupational Groups.—Apart from illegitimate children, in all but two cases the occupation of the husband was accurately elicited. Table VIII covers the occupational groups of 97% of the husbands of the women interviewed.

TABLE VIII.—*Showing Occupational Distribution of Weaning Times*

Occupation	Percentage Weaning Occurring at			
	0–4 Wks	5–12 Wks	13–24 Wks	After 24 Wks
Professional	33	15	22	30
Civil servants	24	22	26	28
Skilled workers	22	21	18	39
Services	35	25	15	25
Semi-skilled workers	31	27	19	23
Storekeepers	28	17	30	25
Vehicle drivers	22	22	32	24
Factory workers	31	15	15	39
Labourers	30	22	22	26

Discussion

From a study of previous investigations it is clear that there is a distinct trend towards early weaning (Spence, 1938; Robinson, 1939; Hughes, 1942). The likelihood that this mode will become permanent is given weight by the fact that the gross initial incidence of breast-feeding has not fallen to any appreciable extent. Of the 242 primiparae in this series 16% had weaned by the end of the first month, and of these nearly one-half had either not attempted to feed the infant or had failed to establish successful feeding

in the first week. In the analysis of the reasons for weaning at or before 3 months 6% were classified as being unwilling to breast-feed.

Genuine physical incapacity of mother or infant amounted to only 6.1%. Spence (1938) considers that not less than 5% of failures in lactation are due to this cause.

The term "physiological insufficiency" covers a multitude of unsatisfactory causes. In this group the commonest explanation was "My milk just dried up." Where there was any reason to suspect undue worry, shock, or housing conditions which were too bad for a nursing mother to cope with there has been a follow-up, and the reason re-allocated. But a large percentage of failures remain unexplained. In a study of failing lactation Robinson (1943) found that in 40% of women who ceased breast-feeding before the end of the seventh month no adequate reason could either be given or be found on examination. There would seem to be no specific fault, and in the majority of cases the mother insisted that she wished to persist in breast-feeding. In many instances it is not unlikely that the reason was an unadmitted revolt against the conditions in which she was placed—tiredness, small accumulating worries, living under poor or even bad conditions, restriction of freedom, and, possibly, marital anxieties. In such cases home help, the health visitor's continuing interest, and, perhaps most important of all, the attitude of the husband would give the nursing mother that peace of mind and bodily rest so essential throughout lactation. It is not unknown for the husband to forbid breast-feeding. One such individual gave as his reason, "Breast-feeding is a disgusting example to our 12-year-old daughter."

The "danger period" in breast-feeding is primarily at the fourth or fifth week, with a second relapse about the tenth or twelfth week. The value, or otherwise, of complementary feeds at such times has been strongly voiced (Lishman, 1944; Hughes, 1942). We have found that even in the early stages many mothers are enabled to resume full breast-feeding after the use of small complementary feeds for only a week or ten days. It is true that a large number of mothers give up, and no aspect of infant feeding is fraught with greater disappointment.

The use of a single 2-p.m. test feed can be very misleading. It is here that the clinic medical officer—and, no less, the practitioner—faces a substantial obstacle. It helps considerably to have mothers for test feeds encouraged to attend the clinic slightly earlier than the normal session so that one may examine the breasts before the feed and again during the feeding. In really co-operative cases—and the fullest co-operation is an essential in early complementary feeding—the health visitor can usually arrange to carry out three consecutive test feeds, or at least a minimum of two, including the one at the clinic. Complementary feeds at the later stages—from the eighth week onwards—can be resorted to more confidently.

In a pre-war study Robinson (1939) found that of the 67 primiparae living in rooms in 100 consecutive cases approximately 70% had weaned by eight weeks. In the present survey the highest percentage of weanings occurs in those occupying rooms or in the even more indefinite menage with "in-laws." Naturally, the greatest number of primiparae are also found in those circumstances. The effect of "friends and relations" can be thoroughly disheartening to the inexperienced, and I am of the opinion that housing difficulties as they exist at present, and the close proximity of relations, together constitute a major menace to successful breast-feeding. This position may have some bearing on the unsatisfactory district figures compared with those of nursing-homes on the question of weaning by the end of the second week.

In the Ministry of Health Report (1944) the statement is made that the Advisory Committee estimated that 95% of babies born on the district are wholly breast-fed when the midwife leaves, while only 80% of babies leave hospital fully breast-fed. For these results the "over-mechanized methods" of hospitals are blamed. In this series 83.8% of babies born in the County Council Maternity Home were wholly breast-fed at 14 days, while the corresponding district figure was 76.9%. Locally, at least, "over-mechanized methods" do not appear as an outstanding cause of failure.

This investigation shows that each of the occupational groups chosen has its own specific weaning rate. In her Liverpool series on the weaning rates in ten classes of the population in the years 1930–40, Robinson (1941) found a difference of only 8% at the end of the first month and only 3% between the classes at the fourth to seventh months. The smallest range—12%—in the present survey occurs between the fifth and twelfth weeks. In a series of this size we are not justified in drawing general conclusions from these findings.

From the collected material available it is unfortunately not possible to give accurate morbidity rates relative to breast-feeding; it was established, however, that no case of gastro-enteritis requiring treatment in hospital had occurred in babies who had been wholly breast-fed for three months or longer.

Summary

The results of an investigation into the incidence of breast-feeding in an area of North Hertfordshire in 1946–7 are analysed.

The number of babies completely breast-fed at 6 months was estimated at the low figure of 13.2%.

Although the primary incidence of breast-feeding has not appreciably altered there is evidence of a shortening of the duration. The "mode" in breast-feeding is set by the primiparae, who favour the shortened duration.

An evaluation is made of complementary feeding.

The effects of housing accommodation are tabulated and discussed.

A comparison is drawn between the early weaning rates of babies born in maternity homes and those on the district.

I have to thank Dr. J. L. Dunlop, county medical officer of Hertfordshire, for permission to undertake this investigation, and the staff of the County Health Department for their interest and assistance. Most of the interviews were carried out by the health visitors of Hitchin, and I am most deeply indebted to them for their sustained interest and the willingness with which they agreed to perform these additional tasks. The permission of the Librarian of Cambridge University Library to peruse the medical literature is also gratefully acknowledged.

REFERENCES

Hughes, E. L. (1942). *British Medical Journal*, **2**, 69.
Lishman, F. J. G. (1944). *Practitioner*, **153**, 176.
Ministry of Health (1944). Reports on Public Health and Medical Subjects, No. 91. H.M.S.O., London.
Robinson, M. (1939). *Arch. Dis. Childh.*, **14**, 259.
—— (1941). Ibid., **16**, 31.
—— (1943). *Lancet*, **1**, 66.
Spence, J. C. (1938). *British Medical Journal*, **2**, 729.
Waller, H. K. (1947). *Brit. med. Bull.*, **5**, 1110.

The Ministry of Health states that the universities should pay the expenses of printing, local advertisement, and distribution of the syllabuses of hospital courses for the postgraduate education of general practitioners. The costs should not fall on hospital funds.

ASCHHEIM-ZONDEK AND HOGBEN PREGNANCY TESTS MODIFIED AND COMPARED

BY

F. W. LANDGREBE, D.Sc.

AND

B. M. HOBSON, B.Sc.

(From the Department of Public Health and Social Medicine, University of Edinburgh)

During 1948 the new laboratory of the Pregnancy Diagnosis Station of the University of Edinburgh was equipped to carry out the Hogben test. Most of the tests now carried out here are Hogben tests, though a large proportion of Aschheim–Zondek tests are still performed, partly because many practitioners do not send us enough urine.

Modifications

During this period modifications to both methods have been introduced which have resulted in a more efficient routine and in greater accuracy. There are now enough data available to show that the Hogben test is suitable for routine diagnosis, and that it is more reliable than the Aschheim–Zondek test. The following modifications are those now in use.

1. Aschheim–Zondek Test

The method used is that described by Robson (1947), with the following modifications. Four mice (obtained from dealers as 3-weeks-old females) are used instead of five. The pretreatment of urine (testing with universal indicator, addition of acid, or shaking with ether when toxic) and the addition of 1 g. of sulphosalicylic acid to 30 ml. of urine have been discarded in favour of the following: four drops of 20% thymol in alcohol are added to 30 ml. of urine immediately on arrival of the specimen. This simple modification has reduced the percentage of urines which prove toxic to the test mice. This is in conformity with the findings of Zondek and Black (1946), who decided that toxicity was not a property of normal urine, but was formed, on standing, by bacteria in the urine. It should be added that the mice tolerate thymol extremely well, and the effect on the ovaries of the test animals seems more clear-cut.

2. Hogben Test

The method used is that published by Landgrebe and Samson (1944), with the following modifications. Well-fed toads weighing 60–100 g. are used, and must respond by ovulating to 70 i.u. of chorionic gonadotropin instead of 100 i.u. We find that stock animals can be divided into two quite distinct groups with regard to sensitivity, and this test dose enables the less sensitive animals (about 20% of a fresh stock) to be discarded. Toads are used every ten days, as they have been shown to be more sensitive than if used at 21-day intervals (Landgrebe, 1948). They are not, however, used continuously, because they lose weight. It may be that with different conditions of husbandry this would not occur. So in our laboratory they are used three times in one month and the next month not at all—e.g., animals used on Jan. 3, 13, and 25 will be rested during February and used again on March 1, 11, and 23, resting the following month, and so on. This means that a single *Xenopus* toad is used 18 times in a year.

By means of the Scott (1940) technique 60 ml. of urine are concentrated into 5 ml. of extract. One toad only is used for each test, and it receives 2.5 ml. of extract in the dorsal lymph sac (see Landgrebe, 1948). If the toad ovulates within 24 hours the result is recorded as positive. If, however, no ovulation results in 24 hours a second toad is injected with the remainder (2.5 ml.) of the same extract. If both toads are still negative 48 hours after the beginning of the test the result is recorded as negative. This enables 25% more tests to be done with the same number of test animals without loss in accuracy. We find that toads which have previously ovulated can be made to deposit eggs if they are injected, 24 hours after their last ovulation, with "negative urine" or distilled water. It is therefore of the utmost importance that toads be taken from the correct tanks, otherwise many false positive results will be obtained.

Comparison of Results

Slips for confirmation or otherwise are sent out with the results of the tests, but unfortunately owing to lack of co-operation of the medical practitioners only 14% were returned during 1948. It has been assumed in the following table that our errors are duly reported. In the words of one of our local practitioners, "I don't bother to tell you when you are right, but I soon let you know if you are not." Even if this assumption is incorrect the comparison between the two methods is still valid, as a similar proportion of confirmations were received for each test. The first items in the accompanying Table are a summation of data gleaned from the literature.

Test	Source	No. of Tests	Definitely Correct	Doubtful	False Negative	False Positive
A.–Z.	42 authors	26,163	97·9%			
	13 ,,	5,455	97·2%	0·05%	1·6%	1·2%
	Edinburgh P.D.L.	12,567	99%	0·18%	0·72%	0·08%
Hogben	14 authors	7,707	98·9%	0	1·1%	0
	Edinburgh P.D.L.	5,666	99·65%	0	0·32%	0·03%

It will be seen that the Hogben test has produced more reliable results than the A.–Z. test both at Edinburgh and elsewhere—this in spite of the fact that our modification of the A.–Z. has increased the accuracy from an average of 98.4% over many years to 99% in 1948.

The number of false positives (two) given by the Hogben test compares favourably with that given by the A.–Z. test. One of these Hogben false positives was found with urine from a patient with a history of persistent abortion over several years. According to the clinical report received later, she had a discharge for a few days following the dispatch of the specimen. The second false positive did not, however, support the clinical findings, although two toads ovulated to the specimen of urine sent. Thus any attempt to sensitize the test further should be avoided.

Some false negative results are probably due to specimens being collected too soon after the first missed period: ten days should elapse before urine is sent for test. We cannot decide how many of our false negative results are due to this, since in many cases little or no information is sent with specimens of urine.

Conclusion

It is shown that the Hogben is a more reliable test than the A.–Z. Its many other advantages over the A.–Z. have been outlined by several different authors (Elkan, 1946; Herring, 1944; Landgrebe and Samson, 1944; Milton, 1946; Weisman and Coates, 1944; Zwarenstein and Duncan, 1944). With our modifications the advantage of economy is even more obvious. Some of our animals have been used for test over 40 times and are giving consistent and reliable results. We have estimated that, including running costs of the laboratory, a Hogben test can be carried out at less than half the cost of an A.–Z. test.

REFERENCES

Elkan, R. E. (1946). *Post-Grad. med. J.*, **22**, 87.
Herring, L. C. (1944). *Amer. J. med. Tech.*, **10**, 83.
Landgrebe, F. W. (1948). *Proc. roy. Soc. Edinb.*, **63**, 213.
—— and Samson, L. (1944). *J. Obstet. Gynec.*, **51**, 133.
Milton, R. F. (1946). *British Medical Journal*, **2**, 328.
Robson, J. M. (1947). *Recent Advances in Sex and Reproductive Physiology*. Churchill, London.
Scott, L. D. (1940). *Brit. J. exp. Path.*, **21**, 320.
Weisman, A. I., and Coates, C. W. (1944). *The South African Frog in Pregnancy Diagnosis*. Research Bulletin, Clarke & Fretts, N.Y.
Zondek, B., and Black, R. (1946). *Proc. Soc. exp. Biol., N.Y.*, **61**, 140.
Zwarenstein, H., and Duncan, D. G. (1944). *Clin. Proc.*, **3**, 186.

A SIMPLE WEIGHT-REDUCING DIET

BY

H. L. MARRIOTT, C.B.E., M.D., F.R.C.P.
Physician With Charge of Out-patients, Middlesex Hospital

Fifteen years ago I devised a reducing diet, and have since used it for a large number of patients. The essential instructions are as follows:

1. Eat or drink as much as you like (or can get) of :

Lean meat, poultry, game, rabbit, hare, liver, kidney, heart, sweetbread—cooked in any way, but without addition of flour, breadcrumbs, or thick sauces.

Fish (not tinned), boiled or steamed only ; no thick sauce.

Eggs, boiled or poached only.

Potatoes, boiled, steamed, or baked in skins, but not fried, roast, sauté, or " chips " ; not potato powder.

Other vegetables of all kinds (fresh, tinned, or dried) cooked in any way not involving the use of fat.

Salad and tomatoes without oil or mayonnaise.

Beetroot, radishes, watercress, parsley.

Fresh fruit of any kind, including bananas. Also bottled fruit if bottled without sugar. Not tinned or dried fruits (including dates, figs, and raisins).

Sour pickles, not sweet pickles or chutneys.

Clear soup, broth, " bovril," " oxo," " marmite."

Salt, pepper, mustard, vinegar, Worcester sauce (no other sauces).

Saccharin for sweetening.

Water, soda-water, and non-sweetened mineral waters.

Tea and coffee (milk only as allowed below).

2. You may have milk (not condensed) up to half a pint (284 ml.) daily. No cream.

3. You may have three very small pieces of bread per day and take them either one at each main meal or all three at one meal as desired (" very small " means not exceeding 1 oz.—28 g.).

4. You may have *nothing else whatever* ; particularly note that this means :

No butter, margarine, fat, or oil (except for cooking meat, *not* fish).

No sugar, jam, marmalade, honey, sweets, chocolate, cocoa.

No puddings, ices, dried or tinned fruits, nuts.

No bread (except as above), cake, biscuits, toast, patent reducing breads, cereals, oatmeal, " all-bran," " ryvita," " vitawheat."

No barley, rice, macaroni, spaghetti, semolina, sausages, cheese.

No cocktail savouries, alcohol (beer, cider, wines, and spirits).

Weigh before you begin, and thereafter weekly, on the *same scales*, in the *same clothes*, and at the *same time* of day.

The general principle of the diet is simply to allow unrestricted consumption of specified low- and moderate-calorie foods, with measurement of only two foods, milk and bread. It is therefore very simple, and patients generally report it as easy to carry out, even in these days, whether eating at home or in restaurants or as guests.

The opening words " eat or drink as much as you like " seem to predispose to willing co-operation. Encouragement to eat unlimited potatoes generally occasions pleasant surprise. The lay public has deeply rooted the notion that potatoes are more fattening than anything else and, consequently, the obese have usually been denying themselves potatoes, which, in fact, are not of high calorie value unless covered and impregnated with fat in cooking. Obese subjects can eat liberal helpings of boiled, steamed, or baked (without fat) potatoes three times a day and still continue to lose weight.

Weight lost by patients who adhere faithfully to the diet, without any lapses, varies from 15 to 35 lb. (6.8 to 15.9 kg.) in 12 weeks. More can be lost (up to 60 lb. (27.2 kg.) in the very fat) by going on. Prolonged experience enables one to say that a patient with simple obesity who does not lose weight is eating or drinking outside the permitted articles.

After weight reduction has been achieved the patient is left knowing the foods which are most fattening. He or she should be advised to return to ordinary diet but to maintain weekly weighing and check any observed tendency to regain weight by moderate restriction of consumption of the articles listed in Instruction 4.

Hitherto I have not had the diet printed, except for hospital use, but in response to requests from practitioners I have arranged with Messrs. H. K. Lewis & Co., Ltd., 136, Gower Street, W.C.1, to produce it as a printed diet card with the instructions on the front and the weight record on the back. (Price 7d. post free.) The instructions are prefaced by a warning that the diet should not be undertaken except on the advice and under the supervision of a doctor. A footnote states that the card is intended for sale only to registered medical practitioners.

Medical Memoranda

Pylorospasm in the Adult, Complicated by Uraemia

In the *B.M.J.* of Jan. 17, 1948 (p. 99), Mr. A. Hobson mentions the connexion of hypertrophic pyloric stenosis with uraemia. I have recently treated a case similar to his, although mine was undoubtedly pylorospasm instead of true hypertrophic stenosis.

In Price's *Practice of Medicine* (1938) it is remarked that " spasm is often stated to give rise to pyloric obstruction, but the evidence that it can do so is inconclusive, except in the hypertrophic pyloric stenosis of infants." In contrast to this, Beckman (U.S.A.) in his *Treatment in General Practice* under the headings of " nervous dyspepsia " and " pylorospasm " describes cases very similar to that of my patient.

CASE REPORT

In January, 1916, while in the Army, a professional man now aged 60 had jaundice with acute pain and was in hospital for four months. In September, 1916, he underwent appendicectomy for alleged chronic appendicitis, and has suffered from flatulent dyspepsia ever since. He was first seen by me in December, 1919, when he had a temperature of 102° F. (38.9° C.) and a much-enlarged and tender gall-bladder.

In January, 1927, he still had flatulent dyspepsia, and cholecystography on two occasions failed to show the gall-bladder. The report on a barium meal was that the first, second, and half the third part of the duodenum were enormously dilated, possibly by obstruction by the superior mesenteric artery. On my advice an exploratory laparotomy was done. The gall-bladder was removed, but was found to contain no calculus and did not seem to be unhealthy. From this time flatulent dyspepsia had persisted more or less continuously with bouts of vomiting. Barium meals on several occasions showed no abnormality of stomach or duodenum. In March, 1946, he had jaundice with relapse, presumably due to infective hepatitis, which was epidemic at the time. During the summer of 1947, while on holiday in England, he was very ill, vomiting frequently and losing a great deal of weight. He was admitted to hospital, and after barium and fractional test meals was told he was suffering from "cramp of the stomach," which in the light of recent events presumably meant pylorospasm.

I saw him in October, 1947. He was then extremely thin, but stool culture revealed nothing abnormal. By the middle of January, 1948, he had been free of symptoms for three months, had been eating less carefully than for a long time, and had gained some 18 lb. (8.2 kg.). This ruled out any possibility of carcinoma. It was quite evident that his symptoms were closely related to worry, of which he had been free during these three months. On Jan. 20 he relapsed. He now restricted his food, but had vomited several times daily for a week. His subsequent history is as follows:

Jan. 22.—Still vomiting; mental confusion and delusions. Admitted to hospital. Urine: a few granular and hyaline casts; traces of albumin; sp. gr. 1014. Blood urea 172 mg., plasma chlorides 415 mg. per 100 ml.

Jan. 23.—No more vomiting. Urine 14 oz. (400 ml.). Rational at times. B.P. normal. Glucose-saline, 500 ml. b.d. subcutaneously; orange juice, etc.

Jan. 24.—No vomiting. Great mental confusion.

Jan. 25.—No vomiting. Urine, 70 oz. (2 litres). Blood urea, 200 mg. per 100 ml. No noteworthy change occurred for five days.

Jan. 30.—Urine, 70 oz. Blood urea, 72 mg. per 100 ml.

Feb. 1.—Urine, 30 oz. (850 ml.). Vomited copious green fluid several times.

Feb. 2.—Urine, 34 oz. (965 ml.). Copious vomiting.

Feb. 3.—Copious vomiting of green liquid. On inspection very strong peristaltic waves visible in epigastrium, with a swelling as large as a tangerine orange progressing towards the pylorus, as seen in congenital pyloric stenosis of infants. Barium meal: on screening, very strong peristalsis of stomach with antiperistaltic wave after it had reached the pylorus. Two-and-three-quarter hours later no barium had passed the pylorus. Atropine 1/100 gr. (0.65 mg.) subcutaneously; "bellafoline" 10 minims (0.6 ml.) t.d.s.; phenobarbitone ¼ gr. (50 mg.) t.d.s.; glucose-saline 500 ml. b.d.

Feb. 4.—No vomiting. Urine, 20 oz. (570 ml.).

Feb. 5.—No vomiting. Atropine, 1/200 gr. (0.32 mg.) b.d.

Feb. 6.—Copious vomiting. Atropine and bellafoline discontinued. "Antal" 10 ml. I.V. daily for 18 days. (Antal is a French preparation containing 1 mg. of atropine and some sodium bromide.) It was noticed that the very violent peristalsis of the stomach which occurred after the ingestion of any food ceased in a few minutes after the injection of antal; the patient then announced that the spasm had relaxed, and food was passing the pylorus.

On Feb. 20 he was eating cold chicken and ham without inconvenience and had returned to work in his office.

Nov. 10.—For four months past he has been free of all symptoms, eating normally, and feels better than he has done for 25 years.

I believe the "cure" to be due to his realization that the gastric trouble was due to psychological causes.

E. N. RUSSELL, M.D., B.Ch.
Anglo-Swiss Hospital, Alexandria, Egypt.

Sternal Swelling as a Presenting Sign of Hodgkin's Disease

The association between sternal swellings and Hodgkin's disease has been noted by Goldman and Victor (1945) and by Sicher (1948). The latter describes an unusual case in which Hodgkin's disease manifested itself by a sternal swelling of two weeks' duration. The following case is of interest in that a swelling had been present on the sternum for five years before the diagnosis of lymphadenoma was made, and because the patient had been successfully treated for pulmonary tuberculosis.

CASE HISTORY

The patient, a woman aged 36, with a considerable medical history, was notified to this department in July, 1947, as a case of tuberculosis, and was admitted on Aug. 11 to sanatorium for further investigation.

She had had measles and scarlet fever, injuries due to a fall of 30 ft. (9.14 m.) at the age of 13, and pulmonary tuberculosis at 22. She was in sanatorium from July, 1933, to January, 1934, and was treated by left A.P., which was continued privately thereafter; last refill January, 1946. Menstrual disorders for years; had D. and C. in 1943 and again in January, 1947. Chronic dermatitis of both hands.

A small swelling on the upper sternum first noticed about 1942 had remained static. After the uterine operation in January, 1947, the swelling had enlarged noticeably and progressively. In June, 1947, the condition was diagnosed as tuberculosis, and the case was notified to the public health department.

When I first saw her in July, 1947, her general condition was fair. She was febrile, toxic, and anaemic, but, apart from the swelling and some weakness, had no complaint. The lungs showed signs of fibrosis but none of any active disease. The cardiovascular, digestive, and nervous systems were clinically normal. The dermatitis of both hands was in a quiescent phase, but there was slight dry eczema of the webs of the fingers.

The swelling was a rounded painless protuberance on the upper sternum about the level of the second costal cartilages. It was exactly in the midline and occupied almost the breadth of the sternum. There was no tenderness or sign of pointing, but the overlying skin was reddened and fluctuation was present. No parasternal lymph nodes were detected. Aspiration was completely unsuccessful. Radiography of lungs and thorax revealed very slight old fibrosis in the right mid-zone, denser fibrosis in the left mid-zone with pleural thickening, but no sign of active disease or of hilar enlargement. The radiologist also reported a large round swelling of the soft tissues of the sternum both anteriorly and posteriorly about the second rib level; no erosion of the sternum was observed, but the anterior end of the second left rib was ill-defined. Other clinical findings were enlarged glands in both axillae but no adenopathy elsewhere; red cells, 3,730,000; Hb, 53%; white cells, 15,400; B.S.R., 51 mm./hour.

When she was admitted for sanatorium observation on Aug. 11 no definite diagnosis had been made. While various possibilities were recognized, tuberculosis was considered the most probable cause, especially in view of her previous history. On Sept. 4, however, biopsy of glands from the right axilla revealed changes typical of lymphadenoma. The patient was thereafter transferred to a general hospital where she received deep *x*-ray therapy, and was discharged on Nov. 21. Since then she has gone to live in the country and has not been examined, but is known to be fairly well (November, 1948).

I have to thank Dr. S. I. A. Laidlaw, Medical Officer of Health, Glasgow, for permission to publish this case.

J. S. GEMMILL, M.B., D.P.H.,
Divisional Medical Officer,
Public Health Department, Glasgow.

REFERENCES

Goldman, L. G., and Victor, A. W. (1945). *N.Y. St. J. Med.*, **45**, 1313.
Sicher, K. (1948). *British Medical Journal*, **2**, 824.

Reviews

THE NOSE AND THROAT

Diseases of the Nose and Throat. By Sir StClair Thomson, M.D., F.R.C.P., F.R.C.S., and V. E. Negus, M.S., F.R.C.S. Fifth edition. (Pp. 1,004; with 13 colour, 20 radiographic, and 11 other plates, and 369 figures. £3 10s.) London: Cassell and Co. 1948.

This admirable textbook, originally the work of Sir StClair Thomson, has held its leading position since the first edition in 1912. Mr. Negus has kept alive the spirit of the work while adding all advances in knowledge of the subject since the previous edition of 1937.

In the preface Mr. Negus writes: "I commend this book as a monument to its founder and sincerely hope that his spirit will illuminate the work by which the world may recognize and remember him, even though he did not survive to celebrate its completion." Readers will agree that this is certainly so. A book of this calibre gives the reviewer little scope for criticism, only the pleasure of praise; it is most comprehensive. The student will find all he needs and more, and the laryngologist will gain much from the well-balanced views on diagnosis and treatment, which are given in great detail. The writing is scholarly, and at the most there are only two misprints: a few sentences, evidently taken from previous editions, give a feeling of unreality to-day.

The era of antibiotics and chemotherapy has so changed the clinical picture of many diseases which, regarded as dangerous or even fatal in the past, are now susceptible of cure in a matter of days or even hours, and this aspect of medicine is perhaps not sufficiently emphasized.

The subject-matter is divided into thirteen parts: the first concerns embryology and physiology, methods of examination, treatment, and prevention of operative dangers. Under the heading of treatment wise advice is given on what not to use in nasal sprays, and on the use and abuse of cocaine. There is also a clear description of the methods of administration of the sulphonamides and penicillin, though doses at present are larger than those suggested. It is scarcely necessary to-day to give advice about anaesthesia, since this is now in the hands of experts. Conditions affecting the nose are described in part two. Stress is laid on the importance of proper respect for the ciliary mechanism and all this respect implies. The descriptions of nasal accidents and diseases are good and well illustrated, though exception may be taken by the plastic surgeon to the mention of the hinged cartilage graft for the correction of nasal deformity. There is an excellent chapter on allergy.

The paranasal sinuses are discussed justly, and the various operations and their dangers fully explained. For rhino-dacryocystostomy West's operation is preferred to that of Dupuy-Dutemps, a view which is not held by all. Crook's method of washing out the antra in children, under cocaine analgesia, is adequately described and illustrated.

Part four—on growths of the nose and sinuses—is admirable. For growths of the antrum and ethmoid a combination of deep *x* rays and surgery (using diathermy) is advocated, with removal of the hard palate to allow of thorough inspection of the cavity. This treatment is supported by statistics. It is suggested that growth may originate in or involve the frontal sinus, but the great rarity of this might well have been mentioned.

Parts five and six, which are concerned with the naso-pharynx, pharynx, and tonsils, occupy 190 pages and clearly express the present-day views on the "tonsil and adenoids" question. The La Force instrument for removal of adenoids is preferred, as doing least damage to the mucous membrane. Good pictures illustrate the different operations. Differential diagnoses of tonsil infections are given fully. Pharyngeal pouch is stated to arise in the middle line, though anatomically it would seem that the origin should be at one side of the posterior median raphe.

Diseases of the larynx are described in part seven. If one part of this work should be praised more than others it is this. It embodies all Mr. Negus's knowledge, gained from his researches into the comparative anatomy of the larynx and his wide clinical experience and exact observation. These words are particularly applicable to the chapter on the laryngeal paralyses, which make a complicated subject appear very easy. The excellent diagrams will prove a great help to the reader. For the treatment of double abductor paralysis a permanent tracheotomy with a tube incorporating a one-way flap valve is preferred to any other operation. In the description of the treatment of nodules on the cords not enough emphasis is laid on the excellent results of treatment by skilled teachers of voice production, which cures nodes far more quickly than weeks of silence, as advised.

For the treatment of epithelioma of the vocal cord laryngo-fissure is given preference over radium or radon needles inserted through a window in the thyroid cartilage. The descriptions of laryngo-fissure and of laryngectomy are clear and fully illustrated, some of the pictures being those by the late L. Colledge.

An account of diseases of the trachea and bronchi naturally follows in part eight, and exhibits the wide experience of the author. Special points are illustrated by *x* rays, some after lipiodol injection. The author proves, if proof be needed, that bronchoscopy in the hands of the laryngologist has its place.

Part nine deals with the oesophagus. It begins by describing congenital deformities, strictures, and growths and their treatment. An account is given of the author's ingenious method of inserting radon seeds, coupled by links of catgut, round malignant growths through an oesophagoscope. There follows a well-illustrated chapter on the neurological disorders, including achalasia. Dilatation with Hurst's mercury tube or a dilating bag is recommended, and operation is stated seldom to be necessary. Foreign bodies in the air and food passages are fully discussed and their complications explained with *x*-ray reproductions. A separate chapter is devoted to the technique of endoscopy.

The volume concludes with detailed descriptions of chronic infections, tuberculosis, syphilis, and rarer conditions—e.g., glanders, actinomycosis, and scleroma. There is also an account of the acute specific fevers. Lastly, a list of prescriptions is given, with the amounts of the ingredients expressed in English and metric measures.

This book must be in every laryngologist's library. It is so comprehensive that few will not learn something from it, and if the reader desires more detailed information on any particular subject there are full lists of references at the end of every chapter. It is profusely illustrated and contains thirteen excellent colour plates. W. M. MOLLISON.

LABORATORY ANIMALS

The U.F.A.W. Handbook on the Care and Management of Laboratory Animals. With an Appendix on Statistical Analysis. Edited by Alastair N. Worden, M.A., B.Sc., M.R.C.V.S., A.R.I.C. With foreword by Professor T. Dalling, M.A., M.R.C.V.S., F.R.S.Ed. (Pp. 368; 70 illustrations. 31s. 6d.) London: Baillière, Tindall and Cox. 1947.

What etymological quirk has decreed that a humanitarian is a person with kindly feelings for men and other animals, whereas a philanthropist confines his abounding affection to his own species? No answer to this question being known to me, I suggested many years ago that some new word such as philozoist, zoophilist, or even animalitarian was needed to attach to those concerning themselves specifically with the welfare of the animals that we group together as dumb—though many of them are far from that. However, this proposal having been rejected with enthusiasm, I must run the risk of misunderstanding if I declare that this book is a very practical blend of economics and humanitarianism.

Professor Worden and his colleagues are preaching to a simple text—namely, that in the long run it pays to be kind to animals, and to none more than to the dozen or so species used in scientific laboratories in those types of research and control work for which living animals are indispensable. Common sense, not sentimentality, provides the authors with their keynote. "You can," they say, in effect, "get with healthy contented animals more information from the same number, or the same amount of information from a smaller number, than you can from sick and miserable animals." No investigator who has tried—or been compelled to try—both will have any doubts about the truth of this statement, especially if his

comparisons have been submitted to analysis by valid statistical methods.

The number of animals used each year in the laboratories of Great Britain is probably now well over a million, mice being *facile princeps* with more than half that number, guinea-pigs second, and rats third, the figures for those species being of the order of 200,000 and 100,000 respectively. From the point of view of importance, however, both because of the work for which they are essential and because of the esteem in which they are held by the British peoples, the absolutely insignificant number of cats and dogs used annually (about 2,500 to 5,000 of each) is no measure of their relative value in teaching and research. One would therefore have supposed that special treatment would be meted out to them in this book. And so it has—but exactly in the opposite way from what might have been expected at first blush, for the authors say in essence, "Cats and dogs are so difficult that you must consult the experts (some names are given) and keep in touch with the vet. Nothing we could write here would be of any practical help to you." However, one can see behind this the shrewd tactics of the book's level-headed planners, who are willing to run with the laboratory hares in the most friendly association provided they are not also expected to hunt with the anti-vivisectionist hounds. They help to avoid this by their special deference to our domestic pets.

All the same, the book contains useful information on the maintenance—including housing and feeding—and the breeding of several important species besides the most used ones. The value of rabbits, ferrets, pigeons, and hamsters is well known, but it is not so generally appreciated that voles of several species, hedgehogs, canaries, deer mice, and cotton rats are sufficiently often required for scientific work fully to justify assigning to them severally a number of chapters in this book.

In his task of collecting, with some degree of collating, data from various experts the editor has included many excellent illustrations—of buildings, cages, equipment, normal animals—and has supplemented the chapters on individual species by some more general ones on the animal laboratory and on pest control. It would have been helpful to have included also, possibly as an additional short chapter, some discussion on "pure lines," the case for their use in research and assay work, and the best systems for producing and maintaining them. A list of available pure lines, or even of available highly inbred stocks, of mice, rats, guinea-pigs, and rabbits in this country—even if foundation breeding stock is all that can be got "off the shelf"—has never yet been compiled; it could have been, without very much additional work, by the organizers of this book and would have made it still more useful. As things are, we must wait for publication of some authoritative list by the Laboratory Animals Bureau of the Medical Research Council.

In subsequent editions—and these are pretty sure to be needed—I would suggest that some notice be taken of the fact that rats—albinos and hooded strains at any rate—can be bred in wooden cages of suitable design and that some of the healthiest and most uniform colonies here and in the U.S.A. are so raised. A reference to the use of the "dough-mixer" type of blender for preparing homogeneous diets, whether stock or experimental, might call some readers' attention to one of the most potent of all time-saving arrangements in animal diet kitchens, even for relatively small colonies. It might have been a good idea to include *Passer domesticus* in the list of pests that can bring disease to animal houses and to call attention to the corollary need for "sparrow-proof" windows and ventilators.

Two outstanding features of this book, both by the Federation's energetic chairman, Major C. W. Hume, are a chapter on "Law and Practice: the Rights of Laboratory Animals"—a brilliant and highly instructive survey of the present law governing experiments on animals—and an appendix with the modest title "A Conspectus of the Elements of Statistical Analysis." This occupies 20 pages and is a masterpiece of expository condensation. It alone is worth almost the whole of the apparently high price charged for this book. The book is indeed a bargain, and indispensable to all concerned in any way with the production and use of animals in laboratories.

A. L. BACHARACH.

BOOKS RECEIVED

[*Review is not precluded by notice here of books recently received*]

Die Elemente der Nervösen Tätigkeit. By A. E. Kornmüller. (Pp. 120. M. 13.50.) Stuttgart: Georg Thieme. 1947.

Pathologische Physiologie. By R. Wanke. (Pp. 196. M. 24.) Stuttgart: Georg Thieme. 1948.

Conditioned Reflexes and Neuron Organization. By J. Konorski. (Pp. 267. 18s.) Cambridge: The University Press. 1948.

Neurovegetativo. By E. L. Uranga. (Pp. 595. No price.) Buenos Aires: Lopez and Etchegoyen, S.R.L. 1948.

Mental Readjustment. By S. Reiss. (Pp. 167. 10s. 6d.) London: George Allen and Unwin. 1949.

Das Altersulkus an Magen and Zwölffingerdarm. By K. Spang. (Pp. 103. M. 10.50.) Stuttgart: Georg Thieme. 1948.

Arzneitherapie des Praktischen Arztes. By G. Banzer. 3rd ed. (Pp. 320. Unbound M. 10; bound M. 12.) Berlin: Urban and Schwarzenberg. 1949.

Medikamentenlehre für Schwestern. By G. Banzer. (Pp. 129. No price.) Berlin: Urban and Schwarzenberg. 1949.

Diagnostik durch Sehen und Tasten. By H. Kahler. (Pp. 253. 13s. 6d.) Vienna: Springer-Verlag. 1949.

Die Beurteilung der Zurechnungsfähigkeit. By K. Schneider. (Pp. 24. No price.) Stuttgart: Georg Thieme. 1948.

Neoplasms of Bone and Related Conditions. By B. L. Coley, M.D. (Pp. 736. $17.50.) New York: Paul B. Hoeber Inc. 1949.

Dictionnaire des Termes Techniques de Médecine. By M. Garnier and V. Delamare. 15th ed. (Pp. 1,038. No price.) Paris: Librairie Maloine. 1949.

Pathologie Exotique. By H. Harant and N. Duc. (Pp. 272. No price.) Paris: Librairie Maloine. 1948.

Gymnastique Thérapeutique. By A. L. Pécunia. (Pp. 341. No price.) Paris: Librairie Maloine. 1948.

Die Synkopalen Anfälle. By W. Schulte. 2nd ed. (Pp. 92. M. 9.60.) Stuttgart: Georg Thieme. 1949.

Surgeon's Saga. By R. McDouall. (Pp. 330. 15s.) London: Heinemann. 1949.

Handbook of Diseases of the Skin. By R. L. Sutton, M.D., and R. L. Sutton, jun., M.D. (Pp. 749. 63s.) London: Henry Kimpton. 1949.

Groves and Brickdale's Text-Book for Nurses. Revised by J. A. Nixon, C.M.G., F.R.C.P., and Sir C. Wakeley, K.B.E., C.B., F.R.C.S. 7th ed. (Pp. 698. 30s.) London: Geoffrey Cumberlege. 1948.

Social Biology and Welfare. By S. Neville-Rolfe, O.B.E. (Pp. 416. 21s.) London: George Allen and Unwin. 1949.

Blood Transfusion. By E. L. DeGowin, M.D., and others. (Pp. 587. 45s.) London: W. B. Saunders. 1949.

Pathology and Surgery of Thyroid Disease. By J. L. DeCourcy, M.D., and C. B. DeCourcy, M.D. (Pp. 476. 50s.) Oxford: Blackwell Scientific Publications. 1949.

Synopsis of Psychosomatic Diagnosis and Treatment. By F. Dunbar, M.D., and others. (Pp. 501. 32s. 6d.) London: Henry Kimpton. 1948.

The Practice of Refraction. By Sir S. Duke-Elder, K.C.V.O., D.Sc., M.D., F.R.C.S. 5th ed. (Pp. 317. 18s.) London: J. and A. Churchill. 1949.

The Hospital in Contemporary Life. Edited by N. W. Faxon, M.D. (Pp. 288. 27s. 6d.) London: Geoffrey Cumberlege. 1949.

The Annual Charities Register and Digest, 1949. 56th ed. (Pp. 398. 10s. 6d.) London: Longmans, Green. 1949.

Renewal pages for the ***Nelson Loose-Leaf Surgery.***

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY JULY 2 1949

THE GENERAL AND THE SPECIAL

The title of the Presidential Address at this year's Annual Meeting reflected, in a different context, the theme of Professor Jefferson's Lister Oration. Professor Jefferson was concerned with the implications of the modern computing machines and their effect upon our ways of thinking about thinking. Dr. C. W. Curtis Bain, whose thoughtful and highly informative address appears in the opening pages of this *Journal*, discusses by detailed reference to the specialty he practises the impact of the machine on the practice of medicine. Dr. Bain develops his theme by recounting the historical steps that have led to the position of cardiology to-day. The views held at any one time on the circulation of the blood and the function of any part of the cardiovascular system are determined to a large extent by the techniques of investigation available. William Harvey, for example, was unable to fill in the gap between artery and vein because he had no microscope with which to see the capillaries. Old theories that seem to us, with modern knowledge, to have been foolish were not necessarily foolish in the setting in which they appeared, such as those of Galen on the circulation. Medicine has flagged in its pursuit of knowledge when it has clung to theories through an inert acceptance of authority, when it has allowed the theory to become a dogma, to challenge which led to professional ostracism. Vesalius and Harvey were key figures in the scientific renaissance in which medicine played a notable part. Part of their genius was the courage to follow the thought where it led them, to observe objectively, and to challenge authority without fear or favour. In their life and work they illustrated the modern theme, the independence of medicine. To-day this theme has a new variation. The new authority is not Galen ; it is the State. For Medicine the State is the Minister of Health, his lay and medical Civil Servants, and the elongated shadow of the Treasury. Modern medicine is in danger of conflict with these three parts of the State mechanism.

Whatever may be the nature of this conflict, now and in the future, the strength of Medicine lies in the free advancement of knowledge, and how this, at an unequal pace, has taken place in cardiology is recounted with telling point by Dr. Curtis Bain. It might be argued that knowledge cannot advance unimpeded unless the intellectual environment is such as to liberate the spirit of inquiry. Yet the history of the forerunners of the Royal Society suggests that in the times when Milton sighed that the new presbyter was the old priest writ large the stout mind could stand out successfully against the tyranny of the ambitious politician. They excluded from their deliberations all mention of politics. But this cannot be an exact analogy. The twentieth century is not the seventeenth. The phenomenal advances of medicine are counterpoised by the growth of a spirit of political intolerance and arrogance. As an intellectual minority in the community the medical profession is subject to the pressure of the modern environment, created by demagogues who exploit the heedless impulses of the majority. Against this it can oppose the force of tradition and the advancement of medical learning. In the long run these will prevail against the febrilities of the modern political scene and the vagaries of ambitious politicians. These things cannot but obsess a hard-pressed profession, and to-day doctors are by the wish of Parliament and people caught up in the net of the politician.

Dr. Bain, like his fellow Oxonians in the seventeenth century, ignores the ephemeral, and traces the progress in cardiology that owes so much to the introduction of new instruments of measurement, from Sir John Floyer's watch in the early part of the eighteenth century to the catheter which Forssman in 1929 passed through his median basilic vein into the right auricle—and then walked to the *x*-ray department to have its shadow recorded on a film. In the interval between these two events there were the discovery of *x* rays by Roentgen in 1895 ; the work of James Mackenzie while in general practice ; the construction of the electrocardiograph by Einthoven in 1903 and the pioneer researches of Sir Thomas Lewis ; and the introduction of the sphygmomanometer. At a combined meeting of the Sections of Cardiology and Radiology this week there was much discussion on angiocardiography, another method of investigation mentioned by Dr. Bain.

The resources at the disposal of the cardiologist are now considerable, and all will agree with Dr. Bain that " the complete investigation of a patient with heart disease may therefore be a complicated affair." And he finds himself compelled to ask what will be the position of the clinician in the face of so many tests—the clinician, it is clear from the text, being in this case the cardiologist. When the specialist himself begins to feel cluttered up by the techniques of his specialty, then how much more must the general physician and the general practitioner feel at a loss in the presence of the intense specialization characteristic of modern medicine. Dr. Bain in his own specialty points the way out of the maze. As many thoughtful doctors have done before, he

emphasizes, after examining his theme, the importance of clinical examination, backed up by a selection of tests that are trustworthy. It is the clinical examination that enables the physician to synthesize his findings and knowledge, to include in this synthesis what he knows of the whole person who is his patient. Both in this country and in the U.S.A. more and more stress is laid upon this aspect of the art of medicine. And if this is true for the specialist, how much more true is it for the general physician and general practitioner. If the challenge that lies behind the title of Dr. Bain's Presidential Address is to be met, the specialist should take heed of his conclusion, and the profession at large must see to it that, however necessary specialism is, the general physician and the general practitioner hold their fundamental position in relation to the public—that of the doctor who sees the patient as a whole person in a particular setting. So long as this position is maintained the machine will not dominate medicine.

TUBERCULOUS EMPYEMA

The development of a purulent pleural effusion during the course of tuberculosis is a serious complication; unfortunately its seriousness is still not widely enough appreciated. In many cases the tuberculous infection of the pleura is one of the natural modes of termination of the disease; this is especially so in the chronic, advanced bilateral case, less often in the acute pneumonic form in which early pleural perforation occurs. Apart from these groups, in which the illness proceeds swiftly or inexorably to its fatal termination, there is a larger number of cases in which the pleural infection is less fulminant but in which the ultimate prognosis remains bad. Many of these infections occur during the course of artificial pneumothorax treatment. Apart from the serious prognosis, these cases are of great importance to-day, for the patients must remain long in hospital beds that can be ill afforded, and they also require much more individual attention than can often be easily provided. For many reasons, therefore, the efficient treatment of these patients is important: even more important is the prevention of their disability.

Though a tuberculous empyema following artificial pneumothorax treatment may occur in even the most carefully chosen and well-conducted case, the highest incidence of pleural effusion and empyema occurs in those cases in which the collapse is imperfect or contra-selective; often the pneumothorax treatment should never have been started, or if started should have been abandoned at an early date. Elsewhere in this issue Dr. D. A. Andersen reports a follow-up of 74 cases of tuberculous empyema treated in Norwegian hospitals; he rightly states, "It is certainly incorrect to induce an A.P. first in practically every case, as is sometimes done on the grounds that it is an easy and safe method of treatment and therefore should be given a trial." The seriousness of the condition is demonstrated in Andersen's series: 25 of the 74 patients have died, a mortality of nearly 34%. This agrees with the findings of Woodruff,[1] who reported a series of 154 cases with a mortality of 42%, and of Brock,[2] who recorded a mortality of 44% in 90 cases.

The part that artificial pneumothorax treatment plays in tuberculous infection of the pleura has been described in a large number of papers. Morrison[3] has recently reviewed the subject, but his observation that "tuberculous empyema, although a serious complication of pneumothorax treatment, can be controlled in most patients by aspiration of the pus and re-expansion of the lung" would not be generally accepted, though he does qualify the statement by adding, "Thereafter, thoracoplasty is usually necessary." In a number of cases the state of the underlying lung, when the disease is uncontrolled, is such that it should never be allowed to expand, and primary thoracoplasty is desirable. In some it is reasonable to attempt to control the pleural infection by repeated aspiration of air and fluid and by encouraging the lung to expand. Recently, promising results have been obtained in some cases by the use of para-aminosalicylic acid, but this is unlikely to be effective when a bronchial fistula persists or the pleura is too thick and rigid to allow the lung to expand.

How long conservative treatment should be persevered with varies with personal experience and the individual case. Andersen suggests that six months is the absolute limit. Other authorities may feel that this would be far too long in many cases: the pleura has by then usually become very thick, and often sinuses have appeared at aspiration sites. If the empyema does not respond to medical measures it should be treated by thoracoplasty. When secondary infection is present a preliminary drainage is, of course, necessary. In Andersen's series 56.5% of the patients were cured or greatly improved by surgery, and he quotes the figures of Jones and Alexander,[4] who reported cure or improvement in 62.8% of 70 cases. Brock found that in his series of 90 cases of tuberculous empyema 77% of those who were treated conservatively (42 patients) died, whereas out of 48 submitted to thoracoplasty seven died (14%), the total mortality being 44%. Brock also noted that in 21 patients whose empyemata were not secondarily infected only one (5%) died after thoracoplasty. But out of 84 cases of secondarily infected tuberculous empyema 91% of the patients treated without operation

[1] Woodruff, W., *J. thorac. Surg.*, 1938, **7**, 420.
[2] Brock, R. C., *Brit. J. Tuberc.*, 1943, **37**, 18.
[3] Morrison, J. B., *Amer. Rev. Tuberc.*, 1948, **57**, 598.
[4] Alexander, J., *Collapse Therapy of Pulmonary Tuberculosis*, 1937, Springfield, Ill.
[5] Lam, C. R., *Arch. Surg.*, 1948, **56**, 1.

did not recover, while of the 49 treated by drainage and thoracoplasty 79% survived. In Andersen's series 14 out of 19 patients treated without operation died. There can be no question of the seriousness of the condition when treated medically, and Andersen makes a good point when he recommends thoracoplasty in those cases of persistent pleural effusion (not yet frankly purulent) which have not resolved in three months. Five cases of this type of "incipient empyema" were operated upon, with cure in all.

Thoracoplasty controls the disease in the underlying lung and is followed by the obliteration of the infected pleural space in a large proportion of cases. In secondarily infected empyemata it saves life by checking the constant purulent discharge, which sooner or later will cause amyloid disease or other toxic complications. To be effective thoracoplasty must be performed early, before the pleura has become too rigid for rapid and complete collapse to occur. Often drainage is allowed to continue for many months before thoracoplasty is begun, in the hope that the lung will expand and thoracoplasty may prove unnecessary or that a smaller space will have to be closed. Delay for these reasons is never justified, for the patient's condition always deteriorates and a poorer collapse is obtained. Thoracoplasty should be begun within 10–14 days of drainage.

Thoracoplasty can save life in many of these otherwise hopeless cases, but it often happens that a chronic discharging empyema cavity, though small, persists. Unless something is done to close it the patient is doomed to wear a tube for the rest of his life, with the constant necessity for daily dressings. The cavity may shrink down in 2–3 years and either heals or is little trouble; but usually some other form of plastic operation is needed. Andersen advises an operation of the Schede or Robert's type. Few surgeons would be eager to recommend perpetuation of the Schede type of operation to-day; there is a much greater place for plastic operations in which pleural or muscle flaps are used to produce obliteration of the residual cavity. Lam[5] writes of another method—namely, decortication of the lung—which is now being applied for the final closure of tuberculous empyema cavities. He records three cases in which healing was obtained, though in one it is doubtful if the disease was tuberculosis. His cases are few, but the method has been used sufficiently often by surgeons in this country as well as in the U.S.A. to prove that most gratifying results can be obtained. It would seem to be a dangerous or unsatisfactory procedure in tuberculous patients if used without preliminary thoracoplasty, for in many cases the lung (especially the upper part) should never be allowed to expand owing to its diseased state, even if it could do so. Decortication is useful in securing obliteration of the residual infected pleural space after thoracoplasty has controlled the lung lesion and reduced the size of the empyema. When the lung fails to expand to fill the dead space it is usually because it was compressed in the early stages of the pleural effusion and held in its compressed condition by the thickened cortex. If this cortex is removed, the lung (especially the basal parts) will readily expand and fill the empyema space much more easily than would be possible by inserting large muscle grafts; often in thin patients it is difficult or impossible to obtain enough muscle tissue to fill the space completely. After decortication the skin wound can be closed, and if suction drainage is maintained for a few days healing will occur by first intention. Few things are more gratifying to a patient who has faced the dangers of a secondarily infected tuberculous empyema than to find that he has at last been rid of the tube and daily dressings that have been his lot for possibly several years.

CORTISONE IN THE TREATMENT OF RHEUMATISM

The Seventh International Congress on Rheumatic Diseases just ended in New York is likely to prove a landmark in the history of the treatment of those intractable and crippling conditions grouped under the indefinite term "rheumatism." The discovery of the adrenal hormone compound E, by Dr. Edward C. Kendall, now named by him "cortisone," and its application in the treatment of rheumatoid arthritis by Dr. Philip S. Hench and his colleagues, were recently discussed in a leading article[1] in this *Journal*. Their account of the development of this work has now appeared in the June issue[2] of the *Annals of the Rheumatic Diseases*, published by the B.M.A. The history of the treatment of any disease justifies caution in assessing the claims for a new remedy. But the world of medicine is now a ferment of ideas, experiment, and discovery, eagerly using in clinical research the new knowledge and techniques of the pure sciences. The essence of research, as Sir Edward Mellanby pointed out in his recent address[3] on Jenner, is discovery, and in the opinion of the specialists on rheumatism lately assembled in New York an epoch-making discovery has now been made in the treatment of a disease crippling in its effects and the cause of great suffering and waste of human life and effort.

The publicity which is naturally and rightly given to the almost unbelievable improvement obtained when cortisone is used to treat rheumatoid arthritis has raised

[1] *British Medical Journal*, 1949, 1, 812.
[2] *Ann. rheum. Dis.*, 1949, 8, 97.
[3] *British Medical Journal*, 1949, 1, 921.
[4] *J. Amer. med. Ass.*, 1949, 139, 1294.
[5] *New York Times*, June 1, 1949.

the hopes of countless patients, who will no doubt want to know from their doctors whether they can gain similar benefit. Unfortunately cortisone will not be available for very many months, except in small quantities to be used for further clinical trials under, it is hoped, conditions allowing for strict scientific control. Dr. Hench observed at New York that "at this stage we are not justified even to refer to our method as a treatment, except in the investigative sense." The scarcity of cortisone can be judged from the fact stated by Mr. William L. Laurence, the science correspondent of the *New York Times*, that the cost of a three-weeks course of treatment amounts to $18,000. The expense of production is certainly immense at present, and Dr. Kendall states that he and his colleagues at the Mayo Clinic are receiving only a week's supply at a time of cortisone for treating sixteen patients and of the adreno-corticotropic hormone (ACTH) of the pituitary body for treating five patients. This small supply is being carried by aeroplane each week from the Merck laboratories to the Mayo Clinic. The manufacturers are striving to speed up production,[4] but it will not be possible to increase the present small yield until 1950; even then supply is expected to fall far short of demand.[5]

Cortisone is a convenient short word for the adrenal cortical hormone, 17-hydroxy-11-dehydrocorticosterone. It was first isolated by Dr. Kendall from the adrenal cortex in 1935, and he was largely responsible for its partial synthesis, the final stages being completed by Dr. Lewis H. Sarett in the Merck laboratories. At the New York Congress Dr. Hench said that in addition to the remarkable effect in rheumatoid arthritis cortisone alleviated the arthritis associated with psoriasis and also that accompanying lupus erythematosus. Encouraging results had also been obtained in three cases of rheumatic fever. Professor Richard H. Freyberg, of Cornell University, reported good results in the treatment of Strümpell-Marie spondylitis. According to Dr. Edward W. Boland, a patient who was bedridden walked and fed herself within forty-four hours of starting treatment—"After nine days of treatment she literally danced a jig." Professor Walter Bauer, of the Harvard Medical School, from his own experience confirmed the findings of other observers. A report of the Congress will appear in a subsequent issue of this *Journal*. An account of the proceedings at the Congress was also given to the Section of Rheumatology, meeting at Harrogate this week, by Dr. G. D. Kersley. Another important point is that, because of the euphoria and increased mental capacity of those receiving cortisone, workers at the Mayo Clinic are investigating its effects on sufferers from mental disorder.

It must be stressed that in the treatment of rheumatic conditions cortisone is not a cure any more than insulin is for diabetes. Withdrawal of the hormone from a patient with rheumatoid arthritis leads to a relapse into crippledom. For those who want to treat this disease and for those who want to be treated it is therefore not just a question of injecting a few hundred milligrams of an extremely scarce drug in order to be cured; it is a question, so far as is known now, of being able to maintain treatment indefinitely. Both doctors and the public will therefore have to exercise great patience, relying on the skill and experience of the pharmaceutical industry to overcome the immediate problems of manufacture. If the new work now in progress is a great step forward in the treatment of rheumatic conditions, it is no less important an event in the science of endocrinology; in this field the full implications have yet to be explored.

DRUG-RESISTANT TRYPANOSOMES

One of the great difficulties in controlling trypanosomiasis of man or animals in Africa by means of chemotherapy has been the tendency for trypanosomes to develop drug-resistant strains. In commenting[1] on the new drug "antrycide," developed by Curd and Davey for the treatment of trypanosome infections in animals, we mentioned the danger that here also resistant strains might develop. Some information about this has now been published by Wilson.[2] Working at Entebbe in Uganda, he has found that, though the soluble sulphate of antrycide cured *Trypanosoma simiae* in pigs in doses of 3 to 5 mg. per kg. of body weight, yet one pig infected with *T. simiae* and treated with 2 mg. per kg. of the relatively insoluble chloride relapsed, and attempts to cure the infection with 5 mg. per kg. were unsuccessful. In cattle also strains of *T. congolense* and *T. vivax* appear to have become resistant to antrycide, and after treatment they can resist considerably higher doses. One such strain of *T. congolense* passaged in mice was not completely eradicated by 10 mg. per kg. of antrycide sulphate, whereas a field strain obtained from an untreated cow in the same area was cured by 0.5 mg. per kg. of antrycide sulphate. The resistance had therefore increased at least twenty times.

In some cases cattle reinfected a few months after treatment with antrycide and re-treated with curative doses have developed cryptic but nevertheless fatal infections. Should such cryptic infections or prolonged latent infections occur frequently after antrycide treatment an accurate assessment of the true duration of the prophylactic effect will be difficult if not impossible. There is also some evidence to show that *T. vivax*, the other important cattle trypanosome, quickly develops a degree of drug resistance after treatment with antrycide. In animals which have relapsed or become reinfected after treatment with the drug a dose of 5 mg. per kg. will not ensure sterilization of the infection in every case and may favour the development of drug resistance; a dose in excess of 10 mg. per kg. can be toxic.

[1] *British Medical Journal*, 1949, **1**, 63 and 315.
[2] *Nature, Lond.*, 1949, **163**, 873.

Toxic symptoms may develop quickly; the animal loses consciousness, and death takes place two to six hours after treatment. In other cases a severe gastro-enteritis has occurred forty-eight hours after treatment, causing death of the animal in from 6 to 12 days. Another complication reported by Wilson is that treatment with 1 mg. per kg. of dimidium bromide (phenathridinium 1553) of relapse or reinfection with strains of *T. congolense* following antrycide treatment has been unsuccessful: it appears, in fact, that strains resistant to antrycide are resistant also to curative doses of dimidium bromide. As dimidium bromide is the only other drug which has given promising results in infections due to *T. congolense*, this is a serious drawback. Whatever the actual mechanism of drug resistance, it seems likely that early treatment of relapse or reinfected cases is essential if drug-resistant cattle trypanosomes are not to be widely distributed in tropical Africa. Repeated treatments in the field three to four times a year will obviously require most careful planning and may be expensive. It will be some time before the true value of such a procedure in tsetse areas can be assessed.

LABORATORY ANIMALS

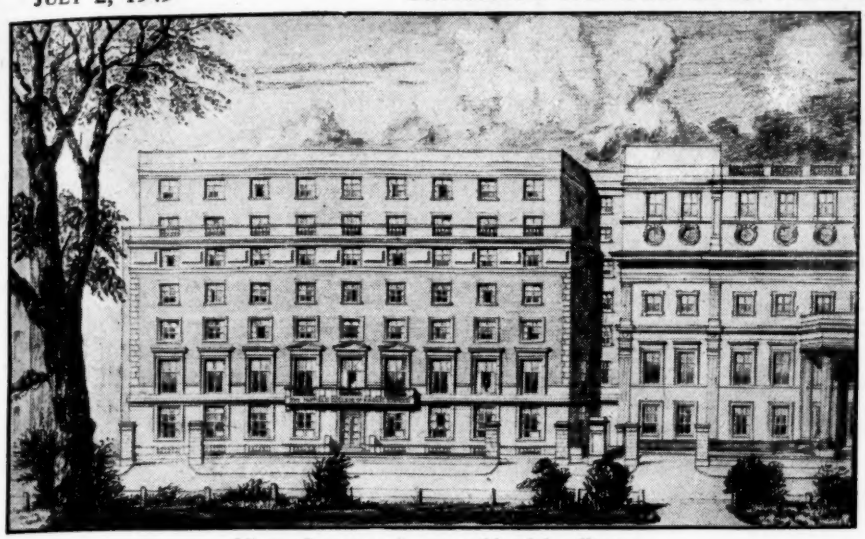
A recent attack by the *Saturday Evening Post* on anti-vivisectionists in the United States has called forth well-deserved praises from the American medical press. The dependence on animal experiments of discoveries like penicillin and tubocurarine, and of inventions like sulphathiazole and stilboestrol—to say nothing of the isolation of vitamins and hormones, such as ascorbic acid or corticosterone—is obvious to medical readers. There are, however, complex and often overlooked problems lying behind the results obtained by laboratory workers who use the whole or surviving organs of living animals as part of their laboratory equipment. Some indications of the importance of this subject is given by, amongst other things, the recent setting up of the Medical Research Council's Laboratory Animals Bureau and by the publication by the Universities Federation for Animal Welfare of a handbook on the care and management of laboratory animals; this book is reviewed on p. 20 in this issue of the *Journal*.

The Laboratory Animals Bureau is a purely co-ordinating body. It is not concerned directly with the production of laboratory animals, though in carrying out its terms of reference, which we understand to be simply that of matching "supply and demand" by directing the would-be user to the appropriate producer and *vice versa*, it may exert a very powerful influence on the numbers and kinds of animals produced, as well as on their genetic and nutritional status and their freedom from infection and infestation. In the course of this work the Bureau will have opportunities for important educational activities, and in this connexion it has already had formal dealings with senior technicians in most of the larger industrial and non-industrial laboratories producing animals, as well as unofficial contact with some of the more important breeders.

The U.F.A.W. *Handbook* itself raises a number of interesting problems—one of them a question of semantics. Major Hume's invaluable introductory chapter on the miscalled "Vivisection Act"—miscalled because not one operation in ten thousand under the Act involves "live cutting"—reminds us that "the Act relates to experiments on living animals which are calculated to give pain." The use of that highly ambiguous word "calculated" may well have played into the hands of anti-vivisectionists, who are likely to use it in the sense of "intended," whereas it clearly should be read in the sense of "likely." It is much to be hoped that this troublesome word will be removed if ever the Act is amended.

The vast majority of laboratory workers using living animals under licence and appropriate certificate regard the Act as an invaluable protection, a point which was stressed by Professor Lovatt Evans in the Stephen Paget Memorial Lecture reported elsewhere in this issue. They would no more support complete absence of Governmental control in these matters, which would leave their flanks completely exposed to the not always too scrupulous attacks of anti-vivisectionists, than they would tolerate or work under conditions that apply in some parts of the United States. It is, we understand, impossible there for some pharmaceutical manufacturers to use laboratory animals whether for research or control, and subterfuges, such as the setting up of a biological institute, become necessary if any biological tests at all are to be applied to products that cannot be assayed otherwise. In this matter it would seem that our own law also might benefit from scrutiny and possible amendment. It was, after all, drawn up long before the possibility of, or indeed the need for, biological assay existed. That is no doubt why, as Major Hume points out, "The Home Secretary could not legally license painful experiments having a commercial objective." Whether the rabbit feels pain after injections of insulin is a moot point: certainly the rabbit assay of insulin has a commercial objective, though it may well have more disinterested ones besides. Surely it would not defy the wit of parliamentary draughtsmen so to reword the Act or its schedules and regulations as to free both the Home Secretary and the bio-assayist from possible embarrassment in this matter.

There are other reasons why a revision of existing legislation seems overdue. The extreme difficulties besetting any worker who wishes to carry out biological research or assays on curare derivatives, the restrictions on any kind of "demonstration" with living animals at meetings of learned societies, and the classifying as "operations" of many hundreds of thousands of painless injections and feeding experiments and tests are all hindrances to the rapid advance of medical science, yet in no way do they assist in giving effective protection to animals. On the other hand, there are good reasons for thinking that many rats, mice, guinea-pigs, and rabbits would be happier if Home Office supervision were extended in a suitable manner to cover commercial and other breeding establishments as well as research laboratories. We believe that most members of the Universities Federation for Animal Welfare and all members of the Research Defence Society would find common ground for constructive improvement at almost every point where the present law is a survival of vestigial precautions rather than a true and "humane" expression of modern requirements.



View of proposed new residential college.

SURGEONS HONOUR LORD NUFFIELD

RESIDENTIAL COLLEGE

The Honorary Fellowship of the Royal College of Surgeons was conferred on Viscount Nuffield on June 23.

Lord Webb-Johnson, P.R.C.S., said that it was nearly seven years since they had invited Lord Nuffield to the College in order to show their appreciation of his tremendous services to British medicine. They had then conferred on him the Honorary Medal of the College—their most exclusive emblem of merit. On that occasion their desire was to do honour to Lord Nuffield because of his remarkable gifts to British medicine. To-day the case was different. Lord Nuffield had made a gift to the College which would provide facilities and amenities unique in the world. They were therefore inviting Lord Nuffield to become one of themselves.

The room was filled, he said, with keen graduate students from all parts of the world. Lord Nuffield knew that London could provide for postgraduate medical students a wealth of opportunity that could not be surpassed; but he saw that there was one thing lacking for aspirants to high places in surgery—a residential college in the precincts of their academic headquarters. Lord Nuffield's gift would provide such a college, and students living there would make contacts with leaders of their profession which would be a stimulus to them and their pupils throughout their lives however many thousands of miles away from London they might be.

Mr. L. E. C. Norbury, Senior Vice-President of the College, introduced Lord Nuffield, saying that his name stood for generosity and progress. They were deeply grateful for all that he had done for the cause of science.

Lord Nuffield was then admitted a Fellow of the Royal College *honoris causa*.

Lord Nuffield thanked the President of the College for the honour that had been bestowed upon him, saying that in his youth he had wanted to be a surgeon, but he had had to wait until that day.

Temporary College Opened

Lord Nuffield then visited the temporary residential college and formally opened it. An account of the college appeared in the *Journal* of May 21 (p. 903). The proposed new building, which will stand next to the Royal College on the east side, is depicted above.

At the luncheon that followed, Dr. Temple Brown, one of the first residents of the college, proposed the health of Lord Nuffield, thanking him for the gift that had made the enterprise possible. This gift of £250,000 was first announced in the *Journal* of Dec. 18, 1948 (p. 1072).

Dr. S. R. Taitz, of Johannesburg, followed, and spoke of the many evidences in South Africa of Lord Nuffield's generosity. Most surgical traditions in the Commonwealth came from Britain, and it was thrilling to come to the fountainhead.

In reply Lord Nuffield said that two specialties had always particularly interested him—orthopaedics and anaesthetics. When some time ago he had suggested establishing chairs in these subjects he had been told that they were unnecessary, that every doctor was an anaesthetist and every surgeon an orthopaedic surgeon. However, all that was in the past, and these specialties were now recognized. He commented on the jealousy he had found in the medical profession, saying that it had in the past hampered him. He was pleased to see so many men there from the Dominions. The residential college would cement friendships between them to the advantage of the whole world.

CENTRE FOR INTERNATIONAL CO-OPERATION IN LONDON

THE CIBA FOUNDATION

The Ciba Foundation for "the promotion of international co-operation in medical and chemical research" was opened on June 22 at 41, Portland Place, London, W.1, by Sir Henry Dale, O.M., F.R.S. The foundation has been endowed by the firm of Ciba, manufacturing chemists of Basle. The centre will be used as a meeting-place for medical research workers and clinicians, and there is accommodation for 15 visitors. If the dignity and elegance of the foundation's headquarters are anything to go by, the work that will be done there should be of a high standard.

Speaking at the opening ceremony for the founders, Dr. Max Hartmann said that the centre had been established in London because of the pre-eminence of British research work, and because the scientific publications in the English language take first place in the world. He believed that the field of research in medicine was limitless, but team-work was essential if practical results were to be achieved. He hoped that the foundation would make practicable the interchange of views among medical scientists on as wide a scale as possible.

Lord Horder, the chairman of the trustees—the others being Lord Beveridge, Professor E. D. Adrian, and Mr. Raymond Needham—referred to the ready acceptance by the founders of a carefully worded trust deed, defining the objects of the foundation. He hoped that clinicians would play an important part in the discussions at the centre and that it would become a forum for international co-operation.

New Responsibilities

In declaring the centre open Sir Henry Dale said that it had many well-conceived and attractive features. The executive council was to be advised by a panel of distinguished scientists. He congratulated the foundation on obtaining a site so close to the centre of London's medical "quarter." He believed that there was nothing more remarkable in this scientific era than the change in the last half-century from traditional therapeutics to the ever-widening range of remedies which deal radically with the causes of disease. The production of these remedies and their proper use laid new responsibilities on doctors and chemists.

The relations between those employed in the pharmaceutical industry and those in hospital, university, and Government posts needed to be strengthened. An atmosphere of genuine confidence and co-operation was wanted for the development of

therapeutic advances. Secrecy was a crippling disease of all healthy scientific activity, and he hoped that the foundation would help to maintain the tradition of international collaboration in medical science. Sir Henry thanked the founders for establishing the centre in London, and said it was appropriate that the idea should originate from Switzerland, the chosen home of the international spirit in medical activity. In conclusion, Lord Beveridge expressed gratitude to Sir Henry Dale for his encouraging remarks.

PHYSIOLOGICAL RESEARCH AND VIVISECTION

STEPHEN PAGET MEMORIAL LECTURE

The eighteenth Stephen Paget Memorial Lecture, given under the auspices of the Research Defence Society, was delivered on June 9 by Professor C. LOVATT EVANS, with Lord HAILEY in the chair.

Professor Evans, whose subject was "Physiological Research and the Vivisection Act," recalled the history of the Act of 1876. It followed upon the Royal Commission appointed during the previous year, the Commission itself being the result of the controversy ensuing upon the establishment in 1874 at University College, London, of the first chair of physiology. From the beginning it was against physiology that anti-vivisectionists directed their abuse. Physiologists had now no complaint to make about the administration of the Act in this country. Rather they welcomed it as a means of protection. It was far otherwise in the United States, where apparently any crank could demand admittance to a laboratory and create a disturbance. Another consequence of the early anti-vivisectionist agitation was the establishment, also in 1876, of the Physiological Society. Physiologists feared that since members of the Government, then as now, were mostly ignorant of science, representations made to them by prejudiced persons might lead to disastrous results in the framing or administration of the Act. The society had had a great influence on the development of physiology throughout the world, but its early work was largely concerned with the Act and with the impediments placed in the way of experiment. Five years after the Act was passed it was stated that there had been many interferences with the work on the part of the Home Office, and three particular instances were given—Fraser's work on the action of "Borneo poison," Brunton's on the treatment of snake bite, and Lister's on the arrest of arterial haemorrhage. The first prosecution was in 1882. It was that of Ferrier for work in conjunction with Yeo, only the latter having a licence. It was proved, however, that only Yeo performed the operation, and the case against Ferrier was dismissed. As in all subsequent legal actions of the kind, said Professor Evans, valuable help was given by the British Medical Association.

The lecturer went on to mention several libel and other actions, including the "brown dog" libel case, in which the late Sir William Bayliss sued the writers of a book and was awarded £2,000 damages. As a rejoinder an anti-vivisectionist later on took up two libel actions, one of which was withdrawn and the other lost. "In short, no court verdict concerning experiments on animals has ever gone against us."

The Royal Commission of 1875 was set up largely because of representations made by the medical profession, and not, as was often supposed, by the anti-vivisection societies. Another Commission was largely the result of anti-vivisectionist propaganda and did not report for six years. The conclusions of that Commission were, on the whole, in favour of the experimentalists. One paragraph in the report stated :

> ". . . the harrowing descriptions and illustrations of operations inflicted on animals, which are frequently circulated by post, advertisement, or otherwise, are in many cases calculated to mislead the public, so far as they suggest that the animals in question were not under an anaesthetic. To represent that animals subjected to experiments in this country are wantonly tortured would, in our opinion, be absolutely false."

Professor Evans said that it was early recognized that the purpose of physiological experiments would usually be frustrated if pain was experienced by the animal, and for that reason, if for no better one, the experimenters were careful to avoid the infliction of pain. The clamour and obstruction of the enemies of science had in no way altered the course of physiological experiment or changed its procedure, but it had made physiologists more alive to the possibility that cruelty might be perpetrated thoughtlessly.

Nowadays the control of anaesthesia had been brought to a fine art, and the latest developments in aseptic surgical technique and in chemotherapy enabled survival experiments, where these were essential, to be carried out under the conditions most favourable for the animal. Prominent among the rapidly growing branches of experimental physiology was that which dealt with human physiology. New techniques and apparatus had allowed some remarkable observations to be made on normal or diseased human subjects. None of these would have been possible without the starting-point of a large body of reliable physiological knowledge, all of which rested on the results of earlier work on animals. It was surprising to what extent this recent work had vindicated the findings of past generations of physiologists. Comparisons showed that, contrary to the assertions of anti-vivisectionist propaganda, the results of experiments on the higher animals did enable conclusions—often far-reaching ones—to be drawn regarding the physiology of man.

A vote of thanks was accorded on the motion of Major Hume, seconded by Dr. N. G. Horner. The society proceeded to reappoint its officers, and Professors J. H. Burn, H. P. Gilding, and A. A. Miles, and Dr. J. W. Trevan were added to the committee. A presentation was made to the retiring secretary, Miss Burgiss-Brown, who has served the society for thirty-eight years.

HOMES FOR AGED SICK

KING EDWARD'S HOSPITAL FUND

The Duke of Gloucester presided at the annual meeting of the general council of King Edward's Hospital Fund for London at St. James's Palace on June 21. Referring to the National Health Service, the president said that there were three main problems.

First, there was the steeply rising cost of the hospital service. The view of the King's Fund had been set out again in the annual report. The old system of accounts was obsolete, and until departmental costing was adopted there was no real means of knowing whether or not money was being used to the best advantage.

Secondly, there was everywhere a disproportion between the number of nurses needed and the numbers likely to be available—even where, as in this country, there had been a steady increase in numbers. The Fund had emphasized the need to build up a larger body of trained nurses in the hospitals. It had recently opened a residential staff college for ward sisters, and the first 24 staff nurses had just gone back to their hospitals to take up their duties as sisters. (See p. 29.)

The third problem, which was common to all countries, was the need to overhaul the administrative machinery. Progress in hospital affairs had been so rapid in recent years that everywhere, sometimes in the most unexpected places, there were to be found departments or even whole units or branches of the service which were content with methods which became obsolete thirty or forty years ago. The reception given to the Fund's memorandum on admissions and records, published last September, shows how widespread was the need for help of this kind. Out of this had come a new school for medical records officers at the Middlesex Hospital, a most welcome development into which the King's Fund had put some £7,500. The Fund was also developing a training centre for hospital caterers at St. Pancras Hospital.

A New Proposal

The Duke of Gloucester went on to describe a development of a different kind, the setting up of homes to which hospitals might send sick persons, normally over 60 years of age, for whom there was no other suitable provision. Other voluntary bodies, notably the Nuffield Corporation for the Aged, were

at work in this field, and the official services were doing what they could. But, largely as the result of first-hand experience of the Emergency Bed Service last winter, it was felt that a vigorous effort was needed to get some hundreds of beds open in homes of this kind before next winter. The Fund was therefore inviting hospitals, through their friends and supporters or through other voluntary bodies prepared to accept the responsibility, to come forward and help. The Fund was prepared within the limits of the scheme to provide the bulk of the capital needed.

The council then approved a resolution setting aside a sum of £250,000 to assist in the establishment of homes for the aged sick no longer in need of active treatment. These homes would be managed by voluntary organizations, but would be linked with the hospital service. The Fund, while providing for the capital expenditure, would rely on the Metropolitan regional hospital boards to enter into contractual arrangements with the homes for the maintenance and care of patients sent into them. Sir Ernest Pooley, chairman of the Management Committee, read the following message from the Minister of Health :

"The Minister welcomes the generous offer of the Fund to allocate £250,000 for capital expenditure for this purpose. In his view the proposal constitutes a social experiment of great value as well as being of real assistance in solving the difficult problem of the accommodation of the chronic sick in the London area."

The accounts for 1948, presented by Sir Edward Peacock, the treasurer, showed an increase in income from investments at £238,827, in part due to the addition to capital in 1948 of £425,000 from the Nuffield Trust for the special areas. Apart from legacies and other special receipts, ordinary income had exceeded expenditure by £67,710. The fact that the Fund did not spend the whole of its income in 1948 was not owing to lack of claimants but rather to the fact that in the new conditions of the hospital world it must proceed with caution. The claims made upon it were innumerable and compelling, but the Fund was anxious to concentrate on those things that were most needed and that it was best fitted to help in providing.

THE FAMILY PLANNING ASSOCIATION

NEED FOR VOLUNTARY EFFORT

The future work and position of the Family Planning Association in the light of the recommendation in the Report on the Royal Commission on Population that advice on contraception should be part of the National Health Service have been described in London by Lady Denman, D.B.E., chairman of the executive committee, and other officials of the association.

Many of the proposals in the Report are what this body has been seeking during the 19 years of its existence—it was formed in 1930 as the National Birth Control Association. It was emphasized, however, that the work of the voluntary organization will be necessary for some time to come if parents are to be advised about the planning of families, and that there was a need for a grant from the Ministry of Health for an expansion of the work of the headquarters, including the setting up of new clinics. Even when the giving of advice on contraception was undertaken by the National Health Service, said Lady Denman, there might still remain work for the association to do. Mrs. S. C. S. Robinson, the general secretary, pointed out that it would take time for a sufficient number of doctors to be trained to give advice on contraceptive methods.

Advisory Clinics

The association, the president of which is Lord Horder, has 78 branch clinics at which medical advice is given on family spacing, infertility, and minor gynaecological disorders. These clinics are situated in England, Wales, and Scotland ; more are in the process of formation, and more are needed. Last year 35,000 new patients attended the clinics, in addition to persons attending for second or additional visits. A number of gynaecological disorders were discovered among the patients ; these were treated at the clinic or referred to hospital. Lady Denman stated that many people did not like going to a big central hospital unless they were seriously ill, but found the association's clinics small and friendly. The association co-operates in the running of clinics in conjunction with local authorities, uring them to use their permissive powers to provide contraceptive advice to women who need it on medical grounds. Of the 145 health authorities in England and Wales, less than 60 provide clinics or special sessions at which advice on contraception is given. About 75 pay grants or fees to local Family Planning Association clinics, and several let or lend premises for use as clinics by Family Planning Association branches. The association is concerned also with providing advice and treatment for infertility, and its centre in London for the investigation and treatment of male sub-fertility is the first of its kind in this country. A centre maintained by the association in London provides the results of diagnostic tests in 24 hours.

It has been found that women prefer to receive advice from women doctors. The association arranges training sessions at clinics for doctors and also lectures for medical students and practitioners. Conferences are arranged from time to time for members of the medical profession and others. The association has standardized tests for manufacturers' goods and set up an approved list of those which have passed these tests. Further information may be obtained from its headquarters, 69, Eccleston Square, S.W.1.

B.C.G. VACCINATION

MINISTRY OF HEALTH PROPOSALS

Arrangements for introducing B.C.G. vaccination against tuberculosis in this country have been made by the Minister of Health and the Secretary of State for Scotland, and the following information has been provided by the Ministry of Health.

It has been thought advisable, since B.C.G. has yet to be tested in the conditions met with in this country, to keep the scheme within defined and suitably controlled limits. One part of the scheme will be to offer B.C.G. vaccination to all hospital nurses and to medical students as a form of inoculation, among others, to which their professional prudence may dispose them : the other part will be to make the vaccine available to chest physicians or other specialists—e.g., paediatricians—who may wish to use the vaccine on their individual responsibility in suitable cases, such as family contacts of tuberculous persons. The medical advisers of the Ministers consider it necessary, at this stage at least, that this form of vaccination should be the responsibility of physicians with specialized knowledge and experience of tuberculosis. It will consequently not be possible for anyone to obtain it by going to his own doctor, though a doctor who may consider it advisable for a particular person will, of course, be able to refer that person to a chest physician. In addition to the two schemes mentioned above, a long-term investigation to assess the value of B.C.G. in this country is contemplated.

The arrangements for giving B.C.G. to hospital nurses and medical students who wish to be vaccinated will be made through the hospitals or the authorities of medical schools, with whom the Departments will communicate about this part of the scheme. It will be a considerable task to plan and carry out these arrangements throughout the country, and it may take a long time to cover all areas.

The chest physicians who will be able to use B.C.G. within their own discretion will for the most part be among those engaged in joint service to regional hospital boards and local health authorities. Where a chest physician in this category undertakes B.C.G. vaccination he will need to do so in the capacity of his local health authority service and in association with the authority's medical officer of health, since it will come within the scope of the authority's responsibility for the prevention of tuberculosis under Part III (Section 28) of the National Health Service Act or Section 27 of the National Health Service (Scotland) Act. A circular will be sent to local health authorities about the procedure to be followed.

Supplies of B.C.G. are to be obtained from the Serum Institute, Copenhagen, from which they will be ordered by the Ministry of Health (or Department of Health for Scotland) and consigned by air weekly. The arrangements for ordering, receiving, and distributing the vaccine will be centralized in this way, because it must be used with the least possible delay after it leaves the laboratory. Instructions will be issued later about the method of ordering the vaccine. Standard forms of record have been prepared.

An exposition about principles and technique of B.C.G. vaccination has been prepared by experts for the assistance of physicians undertaking it. Two points are that it is advisable to vaccinate only persons who do not react to tuberculin, and that the vaccine to be obtained from Copenhagen is suitable only for intradermal use.

STAFF COLLEGE FOR WARD SISTERS

RESIDENTIAL TRAINING CENTRE

King Edward's Hospital Fund for London has opened in South Kensington a staff college for ward sisters. This is a residential training centre accommodating up to 26 students. The students generally have had at least a year's experience in hospital, and are seconded or nominated by a hospital which is a training school, to which they will return on completion of the course. They continue to receive their salary during the course, though not their emoluments, and no fees are charged for either tuition or residence, the whole cost being defrayed by the King's Fund.

The course lasts sixteen weeks and concentrates on three problems which face the ward sister. The first is that of imparting instruction to student nurses in the little time available for this purpose in actual hospital work. The second is that of the achievement of happy staff relations under conditions often of some stress. The third is that of administering the ward with maximum efficiency.

The emphasis is on teaching and administrative methods. The students learn different ward schedules, which they will take back with them and perhaps modify in the actual conditions of their wards. Much of the instruction is given by way of informal group discussion under the principal, Miss A. M. Downer, and the tutor, Miss C. H. S. Dobie. In addition, in the later part of the course, visits are paid to hospitals, where the students work as supernumeraries under experienced ward sisters, study the work of the almoner, the rehabilitation department, and the district nurse, and see something of personnel management. No certificate or diploma is given at the end of the course.

The college itself is in a large adapted house (formerly two houses), 147, Cromwell Road, S.W.7. The average age of the 24 ward sisters at present undertaking the course is 27. The idea behind this pioneer effort is to heighten the prestige of ward sisters' work in general, and to encourage the young trained nurse to remain in her hospital post rather than to seek some less exacting form of nursing employment. It is realized that it is in the hospital ward that the nursing shortage is chiefly felt. It seems that the idea was suggested to the King's Fund by the Ministry of Health, which, with the Ministry of Education, the Royal College of Nursing, and the Royal College of Midwives, is represented on the committee of the staff college. In time, it is hoped, many centres of this sort will be established, and this will become the normal method of training for ward sisters' posts.

The Ophthalmological Society of Egypt is offering a prize to the value of £E20 for "the most valuable contribution brought before the Annual Congress of the society." Papers should be submitted before the beginning of December. The competition is open to members of the society of less than 20 years' practice, and particulars may be obtained from the society, Dar El Hekma, 42, Kasr El Ainy Street, Cairo.

Correspondence

Medicine in the United States

SIR,—Two years ago I wrote a letter in the *Journal* (June 28, 1947, p. 949) giving some impressions of a visit to endocrine and metabolic centres in the U.S.A. Having had the privilege of a similar visit to the U.S.A. and Canada this year, I venture to express some sequential thoughts.

Of the therapeutic application of radioactive iodine I wrote, "The results are conclusively successful in exophthalmic goitre and in toxic adenoma, although the large nodular goitres with pressure symptoms are still thought more suitable for surgery." Two years' experience would permit this statement to stand, although the difficulty of exact calculation of dosage leads to a percentage of myxoedemas of the same incidence as met with after thyroidectomy; and thyrotoxic relapses follow inadequate dosage. In some centres the treatment is used on a large scale as the one of choice, and is especially favoured in recurrence of symptoms after thyroidectomy. The fear of damage to kidneys or germinal epithelium or of a carcinogenic stimulus appears to be regarded as unwarranted with radioactive iodine as distinct from other isotopes, although it is still not generally used for children or young adolescents. Clinical results are certainly impressive.

The recent treatment of rheumatoid arthritis by Kendall's compound E ("cortisone") or by the pituitary adrenocorticotropic hormone, which stimulates the adrenal cortex to produce compound E and/or compounds of similar structure, has caused a stir, and there appears to be no doubt of the dramatic clinical amelioration and of the equally dramatic fall of the sedimentation rate to normal. However, there is relapse in most cases following cessation of therapy, and the effect is regarded as a favourable influence on the normal adaptation or "alarm" mechanism of Selye in a variety of conditions rather than as necessarily specific. Apart from cost, the supply of compound E is not likely to be more than infinitesimal for some time, if ever, but the prospects of supplies of adrenocorticotrophic hormone are less depressing, even if remote.

Two years ago mineral metabolism studies still centred around sodium, but this year several years' study of potassium at the Johns Hopkins metabolic centre are coming to fruition under the able guidance of John E. Howard. It has been observed by those in contact with cases of adrenal insufficiency that excess of desoxycortone, especially with added salt, leads to excessive excretion of potassium and low serum potassium which may prove fatal. Similar potassium findings have been noted in the treatment of diabetic coma and in infantile diarrhoea. The studies at Harvard have shown similar potassium depletion after some surgical operations, particularly those associated with vomiting, diarrhoea, or gastro-intestinal drainage, and may be fatal.

Low serum potassium is rapidly detected by typical electrocardiographic changes, as well as by flame photometer. The giving of intravenous saline after operations accentuates the tendency to low serum-potassium concentration in such cases, and it has been routine for some time at Johns Hopkins to add 40 to 110 milli-equivalents of potassium per day to all intravenous feeding mixtures. Since many of us were impressed by our physiological teaching that potassium in excess is a protoplasmic poison, it is perhaps easy not to be aware of the potentially fatal effects of too little potassium. A lighter side of the subject is that old-fashioned meat extracts, recommended by the Victorian doctor after operations, are found to have a very high potassium content.

In my letter of two years ago I spoke of the exceptionally adequate laboratory and research accommodation that I had seen, both for animal experiment and human metabolic studies. This year I saw the foundation of a 500-bed hospital where the additional planned space for investigation and research is twice that for bed accommodation. Many of us hope that in spite of initial financial stringency the National Health Service will give us such facilities in our major hospitals and that plans for the future will be courageous and made with vision. Space alone,

however, does not necessarily determine good research, and there is no lack of appreciation in America of the fundamental character and high quality of research in this country, and of the clinico-pathological background on which our methods of medical education produce sound results.—I am, etc.,

London, W.1. S. L. SIMPSON.

Tuberculosis in Industry

SIR,—Dr. Stephen Hall's letter (June 11, p. 1049) on this subject raises a number of interesting points. I have heard a good deal about the inquiry into tuberculosis in the boot and shoe industry and from time to time discussed it with Dr. Alice Stewart and her colleagues (May 28, p. 926), and I think the following comments can be made.

1. The phrase "recently infected persons" was a misstatement, due to an attempt to put into different words a clumsy mode of expression which kept on recurring in the text of the MS. But, although it may well reveal some wishful thinking, in the case of this investigation we think it is perhaps not far from the truth. The observations made do *suggest*, indeed, that "transference of bacilli from one worker to another" has taken place. Final proof of this is still lacking, but more evidence in this direction will, I believe, be published later.

2. Dust conditions in boot and shoe factories are now being studied, and figures relating to air-borne bacteria will also be contained in a later report. About dust production in general, there are only two occupations in the industry where this is regarded as excessive. One is associated with a relatively high tuberculosis morbidity rate, and the operations are carried out under cover of dust-extraction plants. The other has no dust extractor and has the lowest rate of all. There may be other reasons for this difference, but the important one which strikes Dr. Stewart and her colleagues is that the former is a light job and the latter a strenuous one. Actually, the highest tuberculosis rates of all in the industry have been encountered in a strictly non-dusty light occupation, which has been found to attract an exceptionally large number of ex-tuberculous persons.

3. We should all agree that it is important for epidemiologists, as it is for clinicians, to know why some persons develop overt disease and others do not, but is it not a step in the right direction, meanwhile, to try to discover where the people are who do break down, and what they are doing?

May I say in conclusion that the findings of Drs. Stewart and Hughes indicate that exogenous reinfection and superinfection—using these terms in the strict sense in which Terplan[1] has used them—may play a considerable part in determining the incidence of the disease in the later age groups, especially in males.—I am, etc.,

Oxford. S. ROODHOUSE GLOYNE.

REFERENCE

1 *Amer. Rev. Tuberc. Suppl.*, 1940, pp. 1-176.

Resectable Carcinoma of the Stomach

SIR,—Dr. A. R. Parsons (June 18, p. 1096) quotes from a paper by me (*Brit. J. Surg.*, 1947, **34**, 379), in which I stated that "of 1,405 patients with cancer of the stomach treated in the London hospitals in 1938–9, only 56 (4.03%) survived for five years." He then proceeds to compare this figure with those published by the Mayo Clinic. As this gives a wrong impression of the results of treatment in the London hospitals, would you permit me to explain that in the paper from which this quotation was taken I gave a table showing that 691 (49.2%) of the 1,405 patients were subjected to laparotomy, and in only 243 (17.3%) was resection possible? The five-year survival rate of these 243 patients was 23.1%, whereas that of the 2,772 patients who underwent resection in the Mayo Clinic was 28.9%.

Apart from an examination of the possible causes for this difference, one of the main objects of my paper was to draw attention to the fact that the figures collected by the British Empire Cancer Campaign prove that 82.7% of patients with cancer of the stomach were beyond hope of cure by the time the surgeon saw them. In the Mayo Clinic the figure was 74.5%.—I am, etc.,

London, S.W.1. W. L. HARNETT.

Abortions and Psychoneurosis

SIR,—The inquest held on the patient who died following the induction of premature labour at the 28th week by Dr. Norman Haire for mental instability and suicidal tendency (reported in the *Journal* of May 7, p. 825) raises the question of how far termination of pregnancy is justified as a treatment or prophylactic for this or almost any other variety of insanity.

Where pregnancy is the apparent cause of the anxiety state in a woman who was previously in normal mental health it seems logical, at first sight, to induce abortion. It is presumed that the removal of the cause of anxiety will be followed by a rapid disappearance of mental symptoms. But the problem is not so easy as this. However simple may be the method of induction, the operation is potentially dangerous where there is fear and deep anxiety. It is difficult to realize that nothing more than the passage of a sound to rupture the membranes or the injection of a few millilitres of a mildly irritant paste can cause fatal shock by vagal inhibition.

In the ordinary routine of hospital work where induction of premature labour is performed for, say, toxaemia, it is a commonplace to rupture the membranes or separate them by the finger above the internal os without the slightest fear or risk of causing shock. But it is a very different operation for those women who are the victims of deep depression by reason of their pregnancy, especially if it is illegitimate and has been concealed. Dr. Keith Simpson (*Lancet*, Jan. 8, 1949, p. 47) has drawn attention to the risks of interference with pregnancy. He states that of 100 fatal cases on which he made post-mortem examinations no fewer than 34 had died "immediately" after the operation—11 from vagal inhibition, 21 from air embolism, and 2 from haemorrhage.

I remember a case of early pregnancy complicated by prolonged bleeding for whom it was agreed that abortion was the correct treatment. An hour after the simple manœuvre of inserting a laminaria tent into the cervix I was alarmed, on being recalled to the house urgently, to find the woman in a state of shock, with cold sweating, pallor, feeble pulse, and clonic movements. The tent was removed immediately, and slow improvement followed. No haemorrhage or injury to the uterus had been caused by the insertion of the tent.

After the necropsy on Dr. Haire's case Dr. Keith Simpson stated at the inquest that he had found no organic disease whatever and no local injury as a result of dilatation of the cervix and injection of the paste. Here, evidently, was a case of death due to vagal inhibition in a single woman deeply depressed by reason of the pregnancy.

The indication for this operation was suicidal tendency as shown by one alleged attempt at self-destruction. And yet death was actually caused by the very measures undertaken to prevent it. Under suitable restraint in a mental home this woman could have been prevented from the risk of suicide. Modern methods of treatment of depressive states have entirely altered the prognosis for these patients and should influence our attitude to the view that if the pregnant woman attempts or even threatens suicide abortion should be induced forthwith.

It falls to obstetricians to perform the actual operation, and it behoves them to be aware of the dangers and very sure of their ground when they receive the recommendation from the psychiatrist. It should be remembered also that a number of depressed women who have had pregnancy terminated suffer from self-guilt and remorse for years afterwards. This is a factor which impedes spontaneous recovery from depression.

There are, of course, occasional cases of mental disturbance where termination of pregnancy may be indicated, but they are uncommon.—I am, etc.,

London, W.1. ALECK BOURNE.

SIR,—Can the bewildered G.P. have some guidance on the psychiatric indications for the termination of pregnancy? In my own practice I am occasionally consulted by some poor unmarried girl who is pregnant. She is invariably in the depths of despair and suffering from an acute anxiety neurosis. When I tell her that it is illegal to interfere with a pregnancy, she very often threatens suicide. In spite of my genuine feeling of pity for her the best I can offer her is to refer her to an antenatal clinic.

Am I failing in my duty in adopting this attitude? Should I refer all these cases to a psychiatrist, who might then recommend abortion? Can they then be referred to hospitals and thus avoid paying impossible fees? Or is it that psychoneurosis of a degree sufficient to justify therapeutic abortion does not occur in working-class girls, but only in those who are more affluent and on a higher intellectual level?

I pose these questions because in my ignorance I cannot distinguish the fundamental difference between my own cases and the ones about whom one reads in the Press. Perhaps some psychiatric authority would give us guidance. By this means we might even put the old lady with a hatpin out of business, relieve the hospital emergency bed service from the strain of dealing with septic abortions (by planning therapeutic abortions some time ahead), and thus save the G.P.s' time in having later to deal with the numerous gynaecological conditions resulting from unskilled interference.

In any case I think I'll send my next case to see the psychiatrist at a general hospital, particularly if she threatens suicide. I am cynical enough to doubt a conclusion agreeable to the patient.—I am, etc.,

Homerton, E.9. P. R. SAVILLE.

Treatment of Hepatic Cirrhosis

SIR,—May I correct an error in your leading article (June 11, p. 1042) on the treatment of hepatic cirrhosis? You report the observation of Ralli, Robson, Clarke, and Hoagland[1] as recording "that parenchymatous hepatitis is associated with a fall in the antidiuretic agent normally present in the urine. . . ." In point of fact these workers reported a considerable increase in the antidiuretic potency of dialysates of urine from patients suffering from cirrhosis of the liver with ascites and peripheral oedema, when tested biologically according to the method of Burn.[2]

This increase has been confirmed by Drill and Frame[3] and more recently by Kunkel, Labby, Ahrens, Shank, and Hoagland.[4] Cases of cirrhosis in which fluid retention was not a marked feature did not excrete the antidiuretic factor greatly in excess of normal.—I am, etc.,

Edinburgh. JAMES S. ROBSON.

REFERENCES

1 *J. clin. Invest.*, 1945, **24**, 316.
2 *Quart. J. Pharm.*, 1931, **4**, 517.
3 *Fed. Proc.*, 1948, Part I, **7**, 215.
4 *Stud. Rockefeller Inst. med. Res.*, 1949, **137**.

*** Dr. Robson, and also Dr. F. G. W. Marson, of Birmingham, who wrote to the same effect, are correct in pointing out that Ralli and his co-workers found a rise in the excretion of the diuretic factor in cirrhosis of the liver, especially in cases with ascites. The important point, however, is that owing to disturbed liver function there is an excess of this factor, presumably due to impaired inactivation by the liver, and in consequence water is retained in the body through a process which is independent of changes in the serum protein.—ED., *B.M.J.*

Infective Hepatitis and Portal Cirrhosis

SIR,—With reference to the letter of Professor N. F. Maclagan (June 18, p. 1095), I wish to state that it was not my intention to dismiss liver function tests as useless, but to indicate that the tests specifically mentioned in my paper (June 11, p. 1032) "are occasionally unreliable in assessing the damage done to the liver." Since the point has been raised I give here the full laboratory findings in the case concerned. The readings given are the results of the tests performed two days before death.

Serum colloidal gold	000000
Thymol turbidity	2 units
Takata-Ara	Negative
Alkaline phosphatase	6 units
Serum bilirubin	32 mg./100 ml.
Serum proteins	2.5 g./100 ml.
Serum albumin	1.7 g./100 ml.
Serum globulin	0.8 g./100 ml.
Icterus index	100
E.S.R.	1 mm./hr.

Urine: Dark brown; albumin, slight cloud; urobilinogen, no excess; bile salts and pigments present. Deposits: leucine and tryosine crystals present.

There is a significant fall in serum proteins, as stressed in my previous paper (*British Medical Journal*, 1948, **1**, 1079), but this fall does not occur in every fatal case. A perusal of records of fatal cases shows that the serum proteins were within normal levels with a normal albumin-globulin ratio in a few cases, while in one case the serum proteins amounted to 9.8 g. per 100 ml. four days before death.

Serum bilirubin figures provide little help in assessing prognosis. Patients with high serum bilirubin levels have recovered, while cases of chronic hepatitis with low serum bilirubin values have ended fatally. One case of chronic hepatitis had a serum bilirubin content of only 0.4 mg. per 100 ml. a few days before death. Urobilinogen estimation is of value only in early cases developing jaundice. A "battery of tests," as suggested, may reveal some abnormal values; but the mere examination of urine may give more reliable information about the impending calamity by revealing leucine and tyrosine crystals. Presence of these in urine, appearance of albuminuria for the first time during the course of illness, and the onset of delirium or coma when taken together give a reliable indication of a fatal termination.—I am, etc.,

London, S.W.7. K. DAMODARAN.

Dried Plasma for Domiciliary Midwifery

SIR,—Dr. C. T. H. Whiteside (June 4, p. 1005) has drawn attention to the value of dried plasma in midwifery. With most of what he says I am in complete agreement. One of the most valuable lessons of the 1939–45 war was the attention it directed to the importance of early and adequate transfusion. It also served to make many of us "transfusion minded," and ever since returning to anaesthetic practice I have carried a supply of dried plasma with me in the car, and on three occasions it has proved, I am certain, a life-saving measure.

The risk of post-transfusion jaundice must be admitted. For that reason I think he goes too far when he suggests that midwives should carry the plasma and be trained to give it. The technique of transfusion is simple, but the decision when to transfuse is difficult, and is a responsibility which I feel can be undertaken only by a doctor.—I am, etc.,

Hove, Sussex. REX BINNING.

SIR,—Mr. W. G. Mills (June 18, p. 1098) does a poor service to domiciliary midwifery in pouring cold water on the idea of intravenous therapy by the general practitioner in obstetric emergencies. While I agree with him that, preferably before shock has occurred or as soon as it has been controlled, a retained placenta should be immediately removed, nevertheless when working 30 miles from hospital, and 80 minutes from the "flying squad," the possession of plasma ready for administration and its actual administration if necessary before, during, or after the removal of the placenta are in my opinion most valuable safeguards which would hardly be neglected in hospital and therefore should certainly not be neglected on the district. By analogy, a general practitioner may give anaesthetics, but he should not give them without the same precautions (oxygen and nikethamide available) as would be taken in hospital.

In the last three years my partner and I, in the course of over two hundred confinements, have removed some eight retained placentae, and in three of these we have been very glad that we carried plasma and were able to give it in good time, and in two cases to save the "flying squad" being called at all. In another case of post-partum haemorrhage not associated with retained placenta we were also grateful for it.

It is agreed that dried plasma, because of its potential dangers, is not an ideal intravenous substance, but it still remains true that every practitioner who is prepared to be called to obstetric emergencies should take with him intravenous equipment. It is possible that dextran or some such substance will eventually take the place of plasma.

I could wish that Mr. Mills would join me in my plea in your correspondence columns some time ago (Dec. 13, 1947, p. 976) for the regional transfusion centres to arrange to keep general practitioners supplied with giving sets. Incidentally, as a

general practitioner I have been led to understand that thiopentone can be a most dangerous anaesthetic in cases of shock.—I am, etc.,

Morpeth, Northumberland. R. P. ROBERTSON.

An Unfortunate Precedent

SIR,—Dr. B. H. Shaw says (June 4, p. 1003) that the Royal College of Physicians should not presume to meddle with professional administration. The professional administration of most of the municipal general hospitals in the country ensured, as far as such a thing is possible, that their standard of medicine could not rise above mediocrity. Was it not desirable that the Colleges and universities should use their influence to alter that state of affairs? It is a misfortune that the difficult financial position of this country is hindering the metamorphosis of these hospitals.—I am, etc.,

Tooting, S.W.17. M. WALKER.

Transfusion Compatibility Tests

SIR,—The conclusion of Dr. R. H. Malone (June 4, p. 1003) that anti-D typing of all patients prior to transfusion is essential is quite irrefutable. It is also probable, however, that a tube compatibility test, using 30% bovine albumin as diluent, will prove most suitable for the busy hospital laboratory. This test is a second line of defence, which will detect incomplete anti-D antibodies, as well as the saline-agglutinating antibodies. Danger from such antibodies, as Dr. Malone points out, should be rare with accurate anti-D typing. Mistakes do occur, however, in the best regulated laboratories, as evidenced by Dr. Kidd's case (June 4, p. 1002), either due to technical or clerical errors.

A cross-matching test in tubes at room temperature and 37° C., using 30% bovine albumin as red-cell diluent, has been in use in this laboratory for some months. The tests are read after four hours as a routine measure: in the case of emergency the tubes are centrifuged after a half-hour. The test is no more time-consuming than the usual one, using saline as diluent, either to set up or to read. Technicians can quickly be taught to differentiate between rouleaux formation, which is rather marked in albumin, and true agglutination.

While agreeing that routine anti-D typing is the first essential in preparation for transfusion to avoid Rh incompatibility, I feel that this modified compatibility test is a valuable additional safeguard.—I am, etc.,

London, E.15. M. S. ROSS.

SIR,—We are in agreement with Dr. R. H. Malone (June 4, p. 1003) on the necessity of Rh grouping before transfusion, and it was not our intention to suggest that this important safeguard should be neglected. It is undertaken as a routine here, in conjunction with the slide compatibility test, in all transfusions matched by the laboratory staff. Until, however, resident blood-bank officers become sufficiently numerous, there must remain a number of transfusions where the selection of blood has to be urgently undertaken by people without laboratory experience, and it is for these occasions that we feel the albumin slide test has special value.

The justification for the routine use of the albumin slide test is that it is simple to perform and detects incompatibilities that the saline test does not. It is true that Rh antibodies in D-positive patients are rare, but in our experience their frequency has not been negligible. In each of these cases the presence of antibodies was anticipated from the history, but it is hazardous to rely on an intelligently taken history being transmitted to the laboratory. It is therefore safest to insist on the routine use of a test that can detect Rh antibodies. Where, from the history, antibodies are expected in a D-positive patient, then the more elaborate tests would, of course, be used in selecting a suitable blood.

We have never, as far as we know, been supplied with an incorrectly labelled bottle of blood, but the test could detect the bottle of Rh-positive blood incorrectly labelled Rh-negative in the case where it mattered most—i.e., when the recipient had strong Rh antibodies.—We are, etc.,

B. GODWIN.
Stoke-on-Trent. A. J. MCCALL.

Prognosis in Hysteria

SIR,—Dr. A. Barham Carter is to be congratulated on the lucid and interesting article on this subject (June 18, p. 1076) in which he describes incidentally the successful results of treating hysterical symptoms. His reference to "physicians who like to do their own psychiatric work so far as is possible" is particularly welcome; and on the strength of this one is emboldened mildly to question the assertion he makes at the outset of his conclusion that "the word 'recovery' will never mean the same to a psychiatrist as to a physician, and one can only try to correlate physical and psychological terms." Given an approach which has regard to the whole organism, is it necessary even to draw distinction between physical and psychological? Dr. Carter obviously combines in his own person the qualities of a physician with the training and experience of a psychiatrist. Should not a psychiatrist, too, be first and foremost a physician?

Explanations why an hysterical symptom disappears are certainly various. Perhaps it has served its (never fully conscious) turn. Or the hastily selected symptom may have become irksome, as instance that of blindness in the case of a young and active man, or aphonia in a naturally talkative woman. The patient may have found that his complaint does not find ready acceptance socially, or even that it results in certain sanctions, such as that of isolation, being applied. The symptom may disappear because it has been substituted by one which seems to serve the (unconscious) purpose better, and, as Dr. Barham Carter well exemplifies, there is always the possibility that the patient may, by understanding on the part of his physician be moved to behave differently, with corresponding advantages for social adjustment.

Dr. Carter's experience that ". . . more good seemed to come from listening than from talking, as patients often found a more satisfactory solution to their problems without further prompting" helps to illustrate that perhaps there is, after all, not so much divergence of aim as between physician and psychiatrist. Widely accepted, and applied with due circumspection, the principles and practice advocated in this article might go far to meet the recognized need for treatment of psychoneurosis in its milder and less chronic forms.—I am, etc.,

Liverpool. S. BARTON HALL.

POINTS FROM LETTERS

Salicylates in Rheumatic Fever

Dr. A. D. MCDWYER (Dublin) writes: Because of its practical importance one must accept with reserve the view of Rantz and colleagues—discussed in a leading article in the *Journal* (Jan. 22, p. 144)—that massive salicylate prophylaxis does not prevent the manifestations of continuing non-suppurative streptococcal disease—really mild to florid rheumatic fever. Without prophylaxis the manifestations are: elevated E.S.R., late fever, carditis, arthritis, purpura, adenitis, pneumonitis. With salicylate prophylaxis they are late fever and carditis. Of the latter, their criteria in general are flat or inverted T waves and prolonged PR interval. Massive salicylates may cause (1) fever (98.6°–100° F. = 37°–37.8° C. rectal) and tachycardia; (2) experimentally, significant alterations of RST and T in standard limb and precordial leads, and abnormal prolongation of QT for given rate (because of this, further observations may well confirm its effect on the PR interval); (3) a non-specific rise or fall in the E.S.R. during therapy and a subsequent rise for 1–4 weeks after therapy ends; (4) experimentally, prevention or suppression of a rise in the leucocyte response to infection. Further, the plasma salicylate in the second week of therapy becomes unstable in the rheumatic subject, rising or falling by 50% on constant dosage, needing an alteration in latter. Does this explain the appearance of subcutaneous nodules when the patient is "saturated" with salicylates? . . . One interesting point emerging from the incidence of the above manifestations is that their incidence of 19.6% is approximate to the estimated incidence of rheumatic fever, etc., in the community at large. The post-mortem statistics of the incidence of mitral stenosis in the general population understates the occurrence of valvulitis, a better test of which would be vascularized but otherwise normal valves—the normal human heart valve is avascular, a point completely ignored in the pathogenesis of septic endocarditis—if allowance is made that other viral diseases such as infectious mononucleosis, can cause valvulitis.

Obituary

SIR THOMAS HOUSTON, O.B.E., M.D.

Sir Thomas Houston, the doyen of the medical profession in Northern Ireland, died on June 21 in his eighty-first year. Until a few days before his death his mind remained receptive of new ideas, his interest in medical science and in current events continued unabated, and his affection and friendship for junior members of the profession maintained his youthful outlook.

Tom Houston was a son of the manse; his father and both of his grandfathers were ministers of the Reformed Presbyterian Church. Born in the Route, close to the rocky coast of North Antrim, he was one of a family of eleven, and received his early education at Coleraine Academical Institution. He entered Queen's College, Belfast, and took his B.A. in 1890, and five years later graduated M.B., Ch.B., B.A.O., with honours, proceeding M.D. in 1899. He won the coveted studentship in pathology of the Royal University of Ireland, and was a research scholar of the British Medical Association in 1902. He was a past president and an honorary fellow of the Ulster Medical Society, and a member of the Pathological Society of Great Britain. In 1937 he was president of the Section of Pathology, Bacteriology, and Immunology at the annual meeting of the B.M.A. He had twice been vice-president of the same Section in earlier years.

After filling the usual junior posts in a teaching hospital Houston was appointed assistant gynaecologist to the Royal Victoria Hospital, Belfast. Even in those early days, however, his main interest was in laboratory and research work. The appointment of Professor Lorrain Smith to the chair of pathology in Belfast, and the close friendship which had developed with Sir Almroth Wright and his colleagues at St. Mary's Hospital, turned Houston's footsteps into the path of clinical pathology. He was the pioneer worker on haematology and applied bacteriology in Northern Ireland, and year after year he stimulated in younger men a love of pathology. Early in his work he recognized the hereditary and familial tendencies of Addison's anaemia and the importance of the chronic carrier of typhoid bacilli in the urine. During the severe outbreak of cerebrospinal fever in Belfast in 1908 he and J. C. Rankin grouped the different types of meningococci. He applied a modification of Wright's opsonic technique in the serological diagnosis of the disease.

Houston was appointed physician in charge of the department of haematology and vaccine therapy in the Royal Victoria Hospital. He was for many years lecturer in toxicology in Queen's College, Belfast. He was also interested in tuberculosis and was physician to the Forster Green Hospital. During the first world war he acted as physician in charge of the medical wards and of the laboratory in the St. John Ambulance Brigade Hospital at Etaples. While studying an epidemic of trench fever he became interested in the enterococcus, an interest he maintained to the end of his life. It is unfortunate that this work of his has never been published, for he had accumulated a vast store of information about this organism, its reaction to its environment, and its possible pathogenic properties. Houston, however, was always hypercritical of his own work. For his services in the war he was mentioned in dispatches, awarded the O.B.E., and made an Esquire of the Venerable Order of St. John of Jerusalem, of which Order he was later appointed a Commander. He was knighted in 1927 for his services to medical science in Northern Ireland. In 1941 the Senate of the Queen's University elected him Pro-Chancellor.

Long after his official connexion with the Royal Victoria Hospital had ended Sir Thomas continued to occupy his usual seat in the laboratory; he was there only a few weeks ago. The memory of the familiar figure at his bench will be preserved by his portrait in oils painted by Mr. Frank McKelvey, which was presented to Sir Thomas last year by his colleagues of the hospital staff. It will hang near the laboratories he loved so well and served so faithfully for over fifty years. Sir Thomas Houston was the most modest of men. He shunned publicity in every form, he was without guile, and he was continually implicated in conspiracies of kindness. While in active practice he was first choice when illness entered a doctor's house. Many medical homes in Ulster have cause to remember him with affectionate gratitude. A quotation frequently on his lips was from the precepts of Hippocrates: "Where the love of man is, there also is love of the Art." No happier epitaph could be found for Sir Thomas Houston.

J. F. O'MALLEY, F.R.C.S

Mr. J. F. O'Malley, who died at Bexhill-on-Sea on June 22 at the age of 80, came of a family of doctors. One of his brothers is professor of surgery and another professor of ophthalmology at University College, Galway, while yet another was in practice in London.

John Francis O'Malley qualified at Dublin in 1895, when he was first scholar, and went into general practice in London. He was early attracted to oto-laryngology, however, and after studying in Vienna he took the F.R.C.S. in 1910. He was appointed aural surgeon to the Evelina Hospital and later to the Hospital of St. John and St. Elizabeth and to the Royal Ear Hospital. On the amalgamation of the Royal Ear Hospital with University College Hospital in 1919 O'Malley became surgeon, and subsequently consulting surgeon, to the ear, nose, and throat department of University College Hospital. In the war of 1914–18 he was ear, nose, and throat specialist, with the rank of Major R.A.M.C., at the Royal Herbert Military Hospital, Woolwich, and was mentioned in dispatches.

At annual meetings of the B.M.A. in 1926 at Nottingham and in 1933 at Dublin O'Malley was vice-president of the Section of Oto-Rhino-Laryngology and in 1932–3 he was president of the Section of Otology of the Royal Society of Medicine. In 1933 he was made an honorary M.Ch. of the National University of Ireland.

O'Malley was interested in all branches of his specialty. He wrote on otosclerosis and arthritis deformans, deprecated the excessive employment of the radical mastoid operation in middle-ear suppuration, and carried out extensive researches on the ventilation of the nasal sinuses, emphasizing the importance of re-establishing air currents. He was a keen golfer, a past president of the Irish Medical Golfing Society, and a hospitable member of the old Sports Club, but his chief interest and hobby was his work, and he was in consulting practice for many years in Upper Wimpole Street. A great favourite with the Irish community in London, O'Malley was always genial, tolerant, and kind-hearted, and he will be remembered as a sound and skilful oto-laryngologist.

DR. WILLIAM ALAN BLOMFIELD, the leading oto-laryngologist of Auckland, New Zealand, died of heart disease on May 16 in hospital at Sydney at the age of 51. Born at Takapuna, the son of a well-known New Zealand journalist, Dr. Blomfield was educated at Auckland University College and at Otago University, where he graduated M.B., Ch.B. in 1923. He then

spent four years in the postgraduate study of diseases of the ear, nose, and throat at Vienna, Birmingham, and London, where he was clinical assistant at the Metropolitan Ear, Nose, and Throat Hospital. He continued his postgraduate studies in Edinburgh, taking the F.R.C.S.Ed. in 1927. On his return to New Zealand he was appointed to the ear, nose, and throat department of Waikato Hospital, Hamilton, and subsequently to the Auckland Hospital. Keenly interested in his specialty, he visited clinics in the United States and England in 1937–8. He also took his full share in the life of his community, was a prominent member of the Rotary and other clubs, and honorary surgeon to the local Jockey Club and the Boxing Association. A charming personality, always ready to extend a helping hand to his juniors, Dr. Blomfield's untimely death is a great loss to oto-laryngology in New Zealand. He is survived by his wife, a daughter, and two sons, to whom the sincere sympathy of his colleagues and friends will be extended.

R. S. S.

Medical Notes in Parliament

NURSES BILL

When the Nurses Bill was considered on Report in the House of Lords on July 21, Lord SHEPHERD said he believed that the measure was now an agreed one. He moved to leave out Clause 4 as it stood, and to substitute the original clause.

In committee, Lord Luke had carried an amendment to delete the clause and to substitute one which took away the authority of the General Nursing Council and the Standing Nurse-Training Committees over expenditure, and transferred that authority to a new independent body. Ministers had attempted to reach an accommodation on the matter so that the Bill could be sent to the House of Commons as an agreed measure. As a consequence of the discussions a series of amendments were to come before the House that day. He recommended the House to delete the present Clause 4 and put back the original clause, and then to meet the views of Lord Luke by creating in the General Nursing Council a Statutory Committee for administering the funds for training nurses. The Bill also provided that when disputes on matters of finance arose in the Standing Nurse-Training Committees there should be an appeal to the General Nursing Council, with whom the final word would rest. The Government believed that it now possessed means by which the 600 schools which existed to-day for training nurses could, through the Standing Nurse-Training Committees, be brought into intimate contact with the General Nursing Council.

Lord LLEWELLIN thought this was a better method than the amendment which his friends had previously inserted in the Bill. He hoped that when the General Nursing Council set up the Finance Committee they would take advantage of the proposal under the first schedule whereby the Minister was to appoint three persons with knowledge of hospital administration and finance. He advised the House to accept this compromise.

Lord WEBB-JOHNSON said the amendment carried on the committee stage had been carried because of anxiety about the position of the teaching hospitals. He felt that anxiety would be removed by the amendments standing in the name of Lord Shepherd.

The House agreed to Lord Shepherd's amendments and to the deletion of Clause 7 (Expenses of Hospital Grants Committee) and the insertion of the following new clause:

(" .—(1) The Council shall appoint a finance committee consisting of members of the Council.

(2) The number of members of the finance committee and their term of office shall be such as may be prescribed by rules made by the Council under subsection (1) of section three of the Act of 1919.

(3) Any matter relating to the discharge by the Council of their functions with respect to the defraying of expenses incurred by standing nurse-training committees shall stand referred to the finance committee and any other matter may be referred by the Council to that committee; and the committee shall consider the matter and report upon it to the Council, and the Council, before taking any action on the matter, shall, unless in the opinion of the Council the matter is urgent, receive and consider the report of the committee.

(4) The power of the Council under paragraph (*f*) of subsection (1) of section three of the Act of 1919 to make rules for authorizing the delegation to committees of the powers of the Council and for regulating the proceedings (including quorum) of committees shall be exercisable in relation to the finance committee.")

On Clause 9 Lord SHEPHERD moved amendments at the request of the General Nursing Council to make it perfectly clear that no nurse trained abroad who had failed to pass an examination forming part of her training should have any title to be admitted to the register. He added that his amendments would not preclude the admission of nurses who had completed training which did not involve the taking of an examination but which the General Nursing Council could regard as satisfactory.

Lord SHEPHERD moved to insert in Clause 10 an additional provision:

" (3) No request under the last foregoing subsection shall be made by the Council with respect to the supplementary part of the register containing the names of nurses trained in the nursing and care of persons suffering from mental diseases unless the Council are satisfied that means exist whereby members of the public can readily ascertain whether a registered nurse has been so trained and no such request shall be so made with respect to the supplementary part of the register containing the names of nurses trained in the nursing of sick children unless the Council are satisfied that means exist whereby members of the public can readily ascertain whether a registered nurse has been so trained."

He said that during the committee stage Lord Webb-Johnson had expressed fears about the position of specialized training. The Government had gone closely into the matter and had produced a new subsection which it hoped would meet the difficulty. They desired in particular to make it clear that the training of sick children's nurses was not to be discontinued. Nothing in the Bill would prevent the General Nursing Council in keeping its register from attaching to the names of registered nurses the special qualifications which they had earned. The Council would have among its members representatives of specialized nurses who would watch these matters.

Lord WEBB-JOHNSON thought the new subsection would safeguard the position of the General Nursing Council. The House agreed.

On the First Schedule Lord SHEPHERD said the Minister had agreed to submit amendments one of which added to the General Nursing Council three persons who would appear to the Minister " to have had experience in the control and management of hospitals." A further amendment was also approved providing for regional elections if in the opinion of the General Nursing Council they appeared desirable. Further drafting amendments were made and the Report Stage concluded.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

J. A. R. Miles, M.B., B.Chir., has been reappointed Huddersfield Lecturer in Special Pathology, and G. W. Harris, M.D., University Lecturer in Physiology, from Jan. 1, 1950, with tenure to the retiring age, and D. B. Cater, F.R.C.S., University Demonstrator in Pathology for five years from Jan. 1, 1950.

The following medical degrees were conferred on June 11:

M.D.—D. H. Davies, M. W. W. Wood, A. G. Marshall, Marjorie Lawton.

M.B., B.Chir.—Joan C. Owen.

M.B.—Phyllis L. Broomhead (by proxy).

In the *Journal* of June 4 (p. 1014) we incorrectly announced that certain honorary degrees were conferred on May 2' On that date *proposals* for the conferment of the degrees were approved. It is expected that they will be *conferred* at a special Congregation to be held on Aug. 20, when the First International Congress of Biochemistry will be held at Cambridge.

The following candidates have been approved at the examination indicated:

FINAL M.B.—*Part I (Surgery, Midwifery, and Gynaecology):* A. G. Ackerley, L. J. H. Arthur, M. J. Ball, J. L. R. Barlow, R. G. Beard, D. A. A. Beardsmore, I. F. Bishop, P. E. Bodkin, G. H. Bond, E. C. A. Bott, S. D. Bradley, H. H. Broadhead, E. A. Cooper, M. B. S. Cooper, H. M. C. Corfield, G. A. Court, E. M. D. Craig,

S. J. Crews, Gwenhwyfar Davies, G. H. J. Dickinson, M. V. Doherty, R. E. Eban, I.-D. Edeleanu, J. W. H. Elder, P. Elliott, G. R. C. Fisher, E. H. R. Ford, D. C. H. Garrod, T. M. D. Gimlette, J. R. Glover, A. Gol, M. P. Goodson, J. D. J. Havard, J. F. Hort, M. J. Hunter, M. M. Ives, E. W. P. Jones, A. K. Knowles, A. S. Law, J. Lynfield, D. H. Mackenzie, I. R. McWhinney, J. L. Milligan, A. O'Brien, D. J. D. Perrins, J. H. Rack, K. F. Robinson, W. Rodger, H. Schlossmann, J. B. Self, R. C. Shepherd, J. T. B. Stewart, R. Thomas, P. D. S. Thomas, P. R. Thompson, J. D. W. Tomlinson, J. F. Trunchion, E. Veldhuyzen, M. P. Ward, R. G. Watkinson, R. H. R. White, B. F. Whitehead, H. B. L. Williams, N. W. H. Young.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

Professor D. W. Gordon Murray, F.R.C.S., will deliver the Moynihan Lecture at the College (Lincoln's Inn Fields, London, W.C.) on Tuesday, July 5, at 5 p.m. His subject is "The Surgery of Congenital Heart Disease."

EPIDEMIOLOGICAL NOTES

Poliomyelitis

Notifications (uncorrected) of poliomyelitis and polio-encephalitis together increased from 19 in the week ended June 11 to 38 in the week ended June 18. Counties with more than one case were London (6), Devon (4), Lancaster (2), Middlesex (3), Southampton (2), Surrey (2), Sussex East (5), Yorks W. Riding (5). In the week ended June 25 groups of cases were reported from Newhaven, Lewisham, Plymouth, and Cornwall. Thus it appears that the small increases so far reported are widely scattered.

Discussion of Table

In *England and Wales* infectious diseases were less prevalent during the week and there were decreases in the notifications of measles 524, whooping-cough 372, scarlet fever 152, acute pneumonia 77, dysentery 46, and diphtheria 12. Exceptions to the general decline were increases in the incidence of paratyphoid fever 17 and typhoid fever 5.

The largest falls in the notifications of measles were London 282, Middlesex 131, Lancashire 114, and Essex 101; the largest rises were Kent 182, Derbyshire 98. The largest decreases in the notifications of whooping-cough were Lancashire 111 and Middlesex 54.

A small decrease in the incidence of scarlet fever was reported in most areas; the largest fall was Cheshire 32. Notifications of diphtheria again reached a new low record, being 6 below the previous lowest figure. The chief feature of the returns for diphtheria was an increase of 7 in Birmingham C.B.

Of the 24 cases of paratyphoid fever 15 were notified in the county of Durham (Hebburn U.D. 5 and Jarrow M.B. 5). The decrease in dysentery was due to the experience of Lancashire, where the notifications fell from 67 to 17 (Oldham C.B. 6 and Liverpool C.B. 8). There were 94 cases of food poisoning notified from Southampton, Fareham, U.D.

In *Scotland* an increase of 119 was reported in the notifications of measles and there were decreases in the incidence of acute primary pneumonia 21 and diphtheria 14. The chief centres of dysentery were in the cities of Glasgow 34 and Dundee 5. Of the 26 cases of diphtheria 17 were notified in Glasgow.

In *Eire* there were decreases in the notifications of whooping-cough 88, measles 19, diarrhoea and enteritis 13, and scarlet fever 9. In contrast to the remainder of the country an increase of 30 in the notifications of measles was recorded in Dublin C.B.

In *Northern Ireland* decreases were recorded in the notifications of measles 13 and whooping-cough 10. The largest outbreak of ringworm in recent years in the British Isles has been reported from County Down. Since last September 395 children in the Newtownards area have been affected.

Week Ending June 18

Notifications of infectious diseases in England and Wales during the week included: scarlet fever 930, whooping-cough 2,253, diphtheria 82, measles 9,152, acute pneumonia 426, cerebrospinal fever 22, acute poliomyelitis 35, dysentery 57, paratyphoid 38, typhoid fever 8.

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended June 11. [No. 23

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1949					1948 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	28	4	14	3	1	45	6	24	1	—
Deaths		—	—				—	—		
Diphtheria	81	4	26	3	3	160	19	47	5	4
Deaths	1	—	—	—	—		—	1	—	—
Dysentery	53	2	51	1	1	95	11	44	—	1
Deaths				—	—				—	—
Encephalitis lethargica, acute	3	1	2	—	—	—	—	1	—	—
Deaths		—					—			
Erysipelas			30	3	6			35	5	1
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				21					25	
Deaths	26	4	—	2	1	38	2	8	4	2
Measles*	9,249	801	576	217	159	12,225	1083	251	125	66
Deaths†			1	—	—			1	1	—
Ophthalmia neonatorum	45	4	5	2	—	48	1	21	- -	—
Deaths										
Paratyphoid fever	24	1	3(B)	—	—	6	1	—	—	—
Deaths	1	—	—	—	—	—	—	—	—	—
Pneumonia, influenzal	416	30	10	6	9	460	15	2	8	—
Deaths (from influenza)‡	8	1	—	—	—	3	—	1	—	1
Pneumonia, primary	147	26	159	16	5	163	30	150	24	11
Deaths				6					1	
Polio-encephalitis, acute	2	—				1	—			
Deaths										
Poliomyelitis, acute	17	2	—	—	—	13	3	8	—	—
Deaths§	4	1				2	1			
Puerperal fever		—	13				1	10		—
Deaths										
Puerperal pyrexia‖	96	11	14	1	—	112	9	13	4	—
Deaths		—					—			
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,090	82	180	63	44	1,562	125	293	53	37
Deaths†			—	1	—			—	1	—
Smallpox	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Typhoid fever	9	2	—	1	—	3	—	1	1	1
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Whooping-cough*	1,806	102	128	76	63	3,298	248	48	80	14
Deaths	8	—	1	2	—	12	2	—	2	—
Deaths (0–1 year)	246	32	26	16	6	289	39	43	11	14
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	4,276	653	573	164	100	4,314	696	531	180	119
Annual death rate (per 1,000 persons living)			11·5	10·2				10·7	11·3	
Live births	7,326	1218	982	420	269	8,349	1307	1082	431	303
Annual rate per 1,000 persons living			19·7	26·0				21·8	27·0	
Stillbirths	192	36	26			212	21	33		
Rate per 1,000 total births (including stillborn)			26					30		

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Deaths from measles and scarlet fever for England and Wales, London (administrative county), will no longer be published.

‡ Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

§ The number of deaths from poliomyelitis and polio-encephalitis for England and Wales, London (administrative county), are combined.

‖ Includes puerperal fever for England and Wales, Eire, and Northern Ireland.

Medical News

Friends of Canterbury Cathedral

A service dedicated to the science and art of healing was held at the annual festival of the Friends of Canterbury Cathedral on June 25, the arrangements for which were described in the *Journal* of April 9 (p. 630). Representatives of the B.M.A., the Royal Colleges, and medical and nursing services were present. Lord Webb-Johnson, P.R.C.S., read the lesson, and Lord Moran, P.R.C.P., gave the address. After speaking of the achievements of medicine in its conflict with diseases of the body, Lord Moran said he could tell no such tale of triumph when physicians had tried to follow the working of the mind and its many aberrations. People had not acquired the art of living together. That was the crucial problem which confronted society. They were all fumbling for a solution. Why was the worker so often without interest in his job? Was it because he was doing the wrong job? The gulf between the worker and the rest of the nation was more dangerous than any gap in our economy. The forgotten art of living together had to be relearnt over the world, and there was great need of tolerance.

Special Diets for Invalids

On the recommendations of the Food Rationing (Special Diets) Advisory Committee the Ministry of Food has made the following rationing arrangements for invalids. *Hepatitis, acute infective hepatitis (catarrhal jaundice), toxic jaundice.*—Meat: a maximum allowance of four rations a week (instead of three). *Hepatitis, chronic (cirrhosis of the liver).*—Meat: a maximum allowance of four rations a week (instead of three). *Hypoproteinaemia.*—Meat: a maximum allowance of five rations a week (instead of four). *Nephritis, with gross oedema and gross albuminuria (nephrosis).*—Meat: a maximum allowance of five rations a week (instead of four).—*Steatorrhoea (including coeliac disease and tropical sprue).*—Meat: a maximum allowance of six rations a week (instead of five). The butter ration will now be retained and only the margarine and cooking fats coupons will be cancelled. Formerly, all the fats coupons were cancelled. *Steatorrhoea, convalescent.*—Meat: a maximum allowance of three rations a week instead of two. Liquid Milk: a priority allowance of seven pints a week. Half-cream National Dried Milk: no change in the present allowance of one tin a week. Butter, Margarine, Cooking Fat: as at present, the coupons will *not* be cancelled. *Diabetes mellitus; hypoglycaemia, spontaneous.*—No change in the present allowances.

The Secretary Honoured

The University of Saskatoon, Saskatchewan, conferred the honorary degree of LL.D. on Dr. Charles Hill, Secretary of the British Medical Association, during his recent visit to Canada.

New Zealand Surgeons to Attend Paris Conference

Sir James Elliott and Mr. Rolland O'Regan, of Wellington, will represent New Zealand at two international medical conferences to be held at Paris in July. Mr. O'Regan will represent the Government at a meeting of the International Cancer Research Commission on July 17–22. Sir James will attend this conference and will also take part in an international conference on tuberculosis towards the end of July. He will represent the Tuberculosis Society of New Zealand.

Honorary Fellowship

Sir Maurice Cassidy has been elected to an Honorary Fellowship of Clare College, Cambridge.

American Honours for British Doctors

Lord Horder and Mr. Lawrence Abel were elected Honorary Fellows of the American Medical Association at its recent annual meeting. Mr. Abel has also been elected Honorary Fellow, and Dr. Cuthbert Dukes Honorary Associate Fellow, of the American Proctological Society.

Inspection of Children's Feet

A useful pamphlet on "Foot Inspection in Childhood and Adolescence" has been prepared for the Foot Health Educational Bureau by a committee under the chairmanship of Brigadier G. S. Parkinson. It is intended to assist school medical officers in examining children's feet, and emphasizes that much disability in later life is the result of uncorrected foot disorders in childhood. It includes suggestions on the examination of feet, a list of references, and a model form for recording the results of the examination. The pamphlet is obtainable from the Bureau at 121, Ebury Street, London, S.W.1.

New Medical School Gazette

The first number of a new periodical called the *Oxford Medical School Gazette* has been published. One issue will appear each term. Information may be obtained from the editor at Osler House, 43, Woodstock Road, Oxford.

British Orthopaedic Association

The following, nominated by the executive committee, were elected at the annual meeting:—*Corresponding Member:* Dr. P. G. K. Bentzon (Denmark). *Fellows:* Mr. F. C. Durbin (Exeter), Mr. J. H. Mayer (Tunbridge Wells), Mr. K. Stanger (Newcastle-upon-Tyne). *Associate Members:* Dr. J. K. Cunninghame (Wellington, N.Z.), Mr. Johnstone Dickie (Leicester), Mr. P. G. Essex-Lopresti (Birmingham), Mr. James Garden (Carluke), Mr. R. N. Grant (Truro), Mr. H. H. Kennedy (Chesterfield), Mr. A. W. L. Kessel (London), Mr. H. Keith Lucas (Liverpool), Mr. T. N. Norton (Grimsby), Dr. W. A. J. Pike (Auckland, N.Z.), Mr. C. G. Rob (Thirsk), Mr. F. H. Stevenson (Stanmore), Mr. T. E. Stoker (Cheam), Mr. G. S. Storrs (Bedford), Mr. G. I. Walley (Windsor), Mr. R. I. Wilson (Exeter).

COMING EVENTS

Exhibition of Medical Photography

The Medical Group of the Royal Photographic Society is holding an exhibition of medical photography at the society's house, 16, Prince's Gate, London, S.W., from Monday, July 4, to Saturday, July 16. The exhibition will be formally opened on July 4, at 6.30 p.m., by Sir Cecil Wakeley.

Health and Tuberculosis Conference

The Second Commonwealth and Empire Health and Tuberculosis Conference will be held by the National Association for the Prevention of Tuberculosis on July 5–8 at the Central Hall, Westminster, London, S.W.1. The following discussions will be held. July 5, 10 a.m.: Tuberculosis as a World Problem; chairman, Sir Robert Young. 2.15 p.m.: Trends in the Modern Treatment of Tuberculosis, Including Streptomycin and P.A.S.; chairman, Sir Robert Young. July 6, 10 a.m.: Regional, County, and County-Borough Tuberculosis Schemes; chairman, Mr. Anthony Greenwood, M.P. 2.15 p.m.: Organization of Comprehensive Tuberculosis Schemes in British Colonies; chairman, Mr. Fred Messer, M.P. July 7, 10 a.m.: Psychological and Sociological Readaptation of Chronic Disease in Industry; chairman, Dr. N. Lloyd Rusby. July 8, 10 a.m.: Protection from Bovine Tuberculous Infection; chairman, Professor W. H. Tytler. Visits to hospitals and other institutions have been arranged to take place on July 8–11. Tickets for them may be obtained on July 5.

Middlesex County Medical Society

The Society's annual visitor's oration will be delivered by Professor Grey Turner on Friday, July 8, at 4.15 p.m. The subject will be "Encouragements in Surgery."

Royal College of Obstetricians and Gynaecologists

A lecture on "Caudal Anaesthesia" will be delivered by Professor R. A. Hingson, Associate Professor of Obstetrics, Johns Hopkins Hospital, Baltimore, U.S.A., at the Royal Society of Medicine (Barnes Hall), 1, Wimpole Street, London, W., on Thursday, July 14, at 5 p.m. The lecture is being given under the auspices of the Royal College of Obstetricians and Gynaeco-

logists, and an invitation is extended to Fellows and Members of the College and other doctors interested in the subject. Admission is by ticket only, obtainable from the secretary of the College at 58, Queen Anne Street, London, W. Tickets will be allotted in order of application.

Summer School in Health Education

The Central Council for Health Education will hold a residential summer school in health education at the School of Domestic Economy, Eastbourne, on July 28–Aug. 11 under the direction of Dr. Robert Sutherland. The school is intended for medical practitioners as well as nurses, social workers, and others interested in health education. The cost of the course, which includes board and tuition, is 15 guineas or 16 guineas, according to room. Particulars may be obtained from the Medical Adviser and Secretary, Central Council for Health Education, Tavistock House, Tavistock Square, London, W.C.1.

SOCIETIES AND LECTURES

Monday

INSTITUTE OF NEUROLOGY, National Hospital, Queen Square, London, W.C.—July 4, 5 p.m., "*Some New Facts on the Painful Stump*," by Professor René Leriche (Paris).

Tuesday

INSTITUTE OF UROLOGY.—At St. Paul's Hospital, Endell Street, London, W.C., July 5, (1) 11 a.m., "*Bacterial Non-gonococcal Urethritis (Post-gonococcal)*," by Dr. A. H. Harkness; (2) 5 p.m., "*Retropubic Operations on the Prostate*," by Mr. A. W. Badenoch.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, London, W.C.—July 5, 5 p.m., "*The Surgery of Congenital Heart Disease*," Moynihan Lecture by Professor D. W. Gordon Murray, F.R.C.S.

Wednesday

INSTITUTE OF UROLOGY.—At St. Paul's Hospital, Endell Street, London, W.C., July 6, (1) 11 a.m., "*Bacterial Non-gonococcal Urethritis*," by Dr. A. H. Harkness; (2) 5 p.m., "*Endoscopic Resection of the Prostate*," by Mr. R. Ogier Ward.

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY.—At Royal Society of Medicine, 1, Wimpole Street, London, W., July 6, 4.30 p.m.; "*Allergy: A Dermatologist's Reminiscences and Speculations*," Prosser White Annual Oration by Professor Marion B. Sulzberger (New York).

Thursday

INSTITUTE OF UROLOGY.—At St. Paul's Hospital, Endell Street, London, W.C., July 7, (1) 11 a.m., "*Abacterial Urethritis*," by Dr. A. H. Harkness; (2) 5 p.m., "*Malignant Disease of the Prostate*," by Mr. H. G. Hanley.

LONDON UNIVERSITY.—At Institute of Neurology, National Hospital, Queen Square, London, W.C., July 7, 5 p.m., "*Surgical Treatment of Myasthenia Gravis*," by Mr. Geoffrey Keynes.

ROYAL SOCIETY, Burlington House, Piccadilly, London, W.—July 7, 2.30 p.m., "*Muscular Contraction and Relaxation: Their Physical and Chemical Basis*," discussion to be opened by Professor A. V. Hill, F.R.S.

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL, Hyde Park Corner, London, S.W.—July 7, 4.30 p.m., "*Psychiatry*," lecture-demonstration by Dr. D. Curran.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Hollings.—On June 19, 1949, at Warrington General Hospital, to Joan (née Eddy), wife of Dr. A. H. Hollings, a son.

DEATHS

Addis.—On June 4, 1949, at Los Angeles, U.S.A., Thomas Addis, M.D., late of Stanford Leland University.

Beveridge.—On June 13, 1949, at 44, Inverleith Place, Edinburgh, William John Morton Beveridge, M.B., B.Chir.

Braid.—On June 17, 1949, at Dunalistair, Milngarie, Elizabeth Grace Braid, M.B., Ch.B.

Cass.—On June 19, 1949, at Edinburgh, Frederick James Duncan Cass, L.R.C.P.&S.Ed., of 2, Eildon Street, Edinburgh, and late of Links Lodge, Montrose.

Connellan.—On June 16, 1949, at 65, Western Avenue, London, W., Edmund Victor Connellan, M.R.C.S., L.R.C.P.

Devers.—On June 9, 1949, Michael Devers, M.B., Ch.B.

Fischer.—On June 15, 1949, at Westwood, Crowborough, Sussex, Ernest Cotton Fischer, M.D., F.R.C.S., aged 83.

Francis.—On June 16, 1949, at 8, Langdale Road, Hove, James Bernard Chalmers Francis, M.R.C.S., L.R.C.P.

Greaves.—On June 14, 1949, Alice Mary Ley Greaves, L.M.S.S.A., of 5, Grosvenor Road, Seaford, Sussex.

John.—On June 9, 1949, at Sandon House, Stoke-on-Trent, Ambrose Hilton John, M.B., B.S., aged 73.

Jones.—On June 15, 1949, at Highfields, Hertford, Evan Jones, M.R.C.S., L.R.C.P.

Keir.—On June 12, 1949, William Wallace Keir, C.M.G., M.B., B.Ch., Surgeon Rear-Admiral R.N., retired, aged 72.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Dicoumarol and Prothrombin Level

Q.—*The required dosage of dicoumarol for patients undergoing anticoagulant therapy has to be judged by the level of prothrombin in the blood. I would like to know the range which is considered to be safe, and the correlation between prothrombin time, prothrombin index, and percentage prothrombin.*

A.—The normal prothrombin time, as measured by means of fresh Russell viper venom, ranges between 15 and 25 seconds with undiluted plasma when the usual technique is employed. Solutions of Russell viper venom are so unstable that it is always wise to measure the prothrombin time in a normal control at the same time as it is measured in the patient. When the normal time is around 20 seconds, the ideal level to be maintained in the patient is between 30 and 40 seconds. The prothrombin index is

$$\frac{\text{the normal time as measured in a control}}{\text{the prothrombin time as measured in the patient}} \times 100$$

and should be maintained between 50 and 66%. The prothrombin activity or percentage prothrombin level is worked out from a graph, which is constructed for the particular patient under consideration, by measuring the prothrombin time with varying dilutions of plasma, usually 100%, 50%, 25%, and 12.5%. The curve that results from plotting the prothrombin times against the plasma dilutions is a rectangular hyperbola, the prothrombin time being inversely proportional to the plasma dilutions; the curve can therefore be converted into a straight line by plotting the time against the reciprocals of the plasma dilutions. From this graph the patient's prothrombin time from day to day may be expressed in terms of percentage activity. Thus, if a time of 40 seconds is seen from the graph to represent the time resulting from 20% plasma dilution, it may be expressed as 20% prothrombin activity. It is usual to aim at 15 to 25% activity when administering dicoumarol.

Hypoglycaemia and Cerebral Lesions

Q.—*Are frequent attacks of mild hypoglycaemia after globin insulin likely to cause temporary or permanent cerebral damage? If so, what are the symptoms and signs, and is there any treatment?*

A.—Provided that the attacks do not cause coma, and are readily relieved when sugar is eaten, cerebral complications will not occur. Periods of coma of short duration are also unlikely to do any damage, but if lasting longer—say, six hours or more—they may cause serious damage to the brain. The less severe symptoms are: (1) loss of memory for recent events, which may gradually return; (2) mental degeneration, which may be permanent or, in the case of children, may gradually improve; (3) complete unconsciousness, which may persist for several weeks before death ensues from pneumonia or other disease. These serious complications only occur if a big mistake has been made in the dose of insulin or if the hypoglycaemia starts soon after the insulin has been injected and before any food is eaten. The hypoglycaemia which follows injection of the ordinary or quick-acting insulin is likely to be of shorter duration than that which occurs after the slow-acting globin and protamine-zinc insulins, and is much less likely to do harm.

If the patient is in coma, subcutaneous injection of 1 ml. of adrenaline, 1 in 1,000, is often efficacious in a mild case, but it is usually necessary to give glucose intravenously as soon as possible. Ampoules which contain 25 ml. of 25% glucose are convenient for this purpose, and the injection of 10 or 20 ml. will usually restore the patient to consciousness at once, but

25 g. (1 oz.) of sugar should be given by mouth as soon as the patient can swallow. If glucose in ampoules is not available, glucose or cane sugar 50 g. (2 oz.) in water can be given through a stomach tube. If these methods are not effective, a drip infusion with 5% glucose in normal saline should be started, and if the patient remains unconscious 2,000 ml. a day may be needed for many days. If the patient has sustained serious damage to the cerebral cells he will need careful re-education, and considerable improvement may be brought about slowly.

Bacteriology of the Throat

Q.—*What is the normal bacteriology of the throat?*

A.—The bacteria to be found in the normal healthy throat may be divided into two groups—the resident and the transient flora. In the first group are included non-haemolytic streptococci of the *viridans* and *salivarius* types, Gram-negative diplococci of the *catarrhalis* group, slender Gram-negative bacilli of the *Haemophilus influenzae* family, and Gram-positive diphtheroids. These bacteria are present in varying numbers in the throats of most people, and, although they are ordinarily not associated with any disease process, some of them are potentially pathogenic, particularly if they have an opportunity to multiply in a *locus minoris resistentiae*. For example, if *Streptococcus viridans* gets into the blood stream after a dental extraction in a patient with damaged heart valves, it may initiate subacute bacterial endocarditis, or *H. influenzae* may act as a secondary infecting organism on the damaged respiratory mucosa after an attack of virus influenza.

In the second group are organisms which are recognized pathogens: *Staphylococcus aureus*, haemolytic streptococci, pneumococci, meningococci, and occasionally diphtheria bacilli. Most people with healthy throats do not carry these organisms continuously, but if the throats of a 100 normal people were swabbed 5 to 10 might be harbouring haemolytic streptococci, 20 to 40 pneumococci, and 2 to 10 meningococci. A month later there might be the same proportion of carriers of these organisms, but not necessarily the same carriers, as on the first swabbing. In other words, most of us are temporary carriers of these pathogens and as a rule suffer no ill effects from the transient invasion. Here again, if local or general resistance is lowered, infection with one or other of these organisms may follow. For instance, bronchial pneumonia and otitis media in infancy are often associated with pneumococcal types—for example, 6 and 19—which are found in the normal child's throat. Such infections might be called endogenous, and are due to bacteria of relatively low virulence. Lobar pneumonia in the healthy adult, on the other hand, is usually due to pneumococcal types of greater virulence and invasiveness—for example, types 1, 2, 5, and 7, which are not ordinarily found in the normal throat. Outbreaks of streptococcal tonsillitis are usually due to one particular strain of streptococcus which spreads from case to case. These are examples of exogenous infections, and it is generally accepted that the great bulk of infection occurs in this way.

Anaphylaxis to A.T.S.

Q.—*A boy of 14, presumably of allergic diathesis, suffers from typical seasonal hay-fever, for which he is undergoing a course of desensitization. About five years ago he had an injection of A.T.S. for a penetrating injury of the foot without ill effect. What is the likelihood of severe anaphylactic reaction following any further injection of A.T.S. or other serum? In the event of his sustaining injury in a road accident, how would the casualty officer in a hospital know of any potential risk in the routine administration of A.T.S., and, in view of this potential danger, what steps ought to be taken?*

A.—The likelihood of a severe anaphylactic reaction after a further injection of A.T.S. in this boy's case is very small. However, before any serum is given in future he should have an intradermal test with 0.02 ml. of the animal serum about to be used, in a dilution of 1 in 100. If this is positive, an ophthalmic test with a 1 in 10 dilution of the serum should be carried out. The tests are read in 10 to 15 minutes. It is important to test with dilutions of the animal serum and not with the therapeutic serum. If the skin reaction is negative, serum can be given by any route, but adrenaline should be easily available. If the skin reaction is positive and the ophthalmic reaction negative, intravenous therapy should be avoided until subcutaneous injections have been given safely; then, if intravenous therapy is necessary, the therapeutic serum should be diluted with saline and given slowly. Administration of an antihistamine drug—such as "anthisan" 300 mg.—should precede any injection of serum, and adrenaline should be immediately available. If reactions to both the skin and the ophthalmic tests are positive, an immediate reaction is probable by any route, and treatment with the serum of this particular animal is contraindicated. The patient should therefore be re-tested with the serum of a different animal. The boy could carry a card with such advice. Alternatively, and preferably, he could be immunized with tetanus toxoid and then carry a card similar to the one used by Unger (*Bronchial Asthma*, p. 611; Charles C. Thomas, Illinois, 1945):

> "*To whom it may concern:* This is to certify that..... is highly allergic and has received two 0.5-ml. doses of *tetanus* toxoid to prevent tetanus. In the event that he sustains an injury for which prophylactic doses of tetanus antitoxin would ordinarily be given, please inject instead 0.5 ml. tetanus toxoid. DO NOT GIVE TETANUS ANTITOXIN."

Distribution of Pain in Coronary Occlusion

Q.—*In a man of 65 severe pain developed over the occipital region and down the back of the neck to both shoulders shortly after he retired and lasted several hours. The next day the pain returned when he went to bed and persisted for several days. It now centred mainly in the back of the neck, in the right infraclavicular region, and down the right arm to the elbow; there was some paraesthesia in the left hand. Radiography revealed extensive disk degeneration between C5, C6, and C7, with marked spondylitis. Two weeks later the patient complained of dyspnoea on exertion, and an electrocardiogram revealed myocardial infarction of recent origin. Has such a distribution of pain been described for coronary occlusion?*

A.—It is possible for the pain of coronary thrombosis to occur in the distribution described, especially so in this case, in which there was cervical spondylitis. It is a very uncommon distribution for referred cardiac pain. Accessory sympathetic afferent fibres occasionally enter the cord at C5, C6, and C7; Heinbecker (*J. thorac. Surg.*, 1932–3, **2**, 517) found a few such fibres at this level. The presence of advanced cervical spondylitis would more easily give rise to referred pain along the cervical nerves caused by summation of stimuli. There is the possibility in this case that the original pain was in fact due to the spondylitis or a prolapsed intervertebral disk, the coronary thrombosis occurring at the time of the dyspnoea.

Chronic Diarrhoea

Q.—*What are the likely causes of persistent loose stools in a man of 24? The condition has persisted for four years and does not respond to sulphonamide therapy or prolonged sedation with phenobarbitone. The patient is a well-nourished, apparently healthy individual with a good appetite, but of the anxious, over-conscientious, sensitive, sympatheticotonic type. There is no evidence of thyrotoxicosis, or any other abnormality apart from a mild pruritus ani and first-degree internal haemorrhoids.*

A.—The possible causes of chronic diarrhoea are innumerable, but in this patient many have been excluded by the long history; for instance, carcinoma of the colon or tuberculous enteritis would have declared itself in unequivocal terms within the period of four years. Undoubtedly the two commonest causes for such symptoms are ulcerative (non-specific) colitis and "nervous diarrhoea." Examination of the stools is essential to exclude infections with *Entamoeba histolytica* or flagellates; chemical analysis may be necessary if their appearance suggests steatorrhoea; the presence of blood and mucus will, of course, indicate colonic ulceration, but affords no clue to its nature. Radiological examination of the colon and sigmoidoscopy will be necessary before ulcerative colitis or other organic disease of the bowel can be discounted. The wording of the question suggests that this has been done, and the description of the

patient makes a diagnosis of nervous diarrhoea probable. A recent discussion at the Royal Society of Medicine (*Proc. R. Soc. Med.*, 1949, **42**, 235) has been devoted to this problem, and particular stress was laid on the patient's personality in these cases.

Anaerobic Streptococci from Uterus

Q.—*Anaerobic streptococci have been isolated from a uterine swab from a patient who had a prolonged labour with post-partum haemorrhage four weeks previously. Three weeks later she still had a "slight loss." On curettage the uterus was found to contain a small amount of serous pus; retained products of conception were present, but there was only a mild degree of polymorphonuclear infiltration of the endometrium. She had a slight fever for three days after the curettage. What is the significance of the finding of anaerobic streptococci?*

A.—Organisms of all kinds, including anaerobic streptococci, can be cultured from the uterine cavity during the early days of the puerperium, and so frequently that their presence is to be regarded as normal. Some workers go so far as to suggest that they play a part in assisting the normal dissolution of fragments of decidua and blood-clot. Bacteria, and often anaerobic streptococci, have also been cultured from histologically normal uteri late in the puerperium in afebrile patients and even apart from pregnancy. The finding of anaerobic streptococci in the uterus is not necessarily serious or even indicative of pathological changes, though these organisms can be the source of major puerperal infections. In this case their continued presence late in the puerperium was no doubt favoured by the retention of necrotic placental tissue. Any infection, however, seems to have been limited almost entirely to this tissue, so that it subsided quickly when the latter was removed. A large literature exists on the subject, but two of the more recent references are: Holmstrom, E. G., and Murata, A., *Amer. J. Obstet. Gynec.*, 1948, **56**, 531; Hesseltine, H. C., and Hite, K. Eileen, ibid., 1949, **57**, 143.

Ergotamine and Pregnancy

Q.—*Is the administration of ergotamine tartrate liable to cause abortion? A patient who has suffered from migraine for several years has been treated with ergotamine tartrate. She has now missed two periods and is presumed to be pregnant. What alternative treatment can be recommended, or is it safe to continue with ergotamine?*

A.—Unless the patient's previous history suggests a special susceptibility to abortion or premature labour, ergotamine is unlikely to have any significant effect on the uterus, and its continued administration is therefore not contraindicated. It may be found, however, that during pregnancy the attacks of migraine will become less frequent or even cease, and consequently the treatment will be unnecessary.

Sydenham's Chorea

Q.—*A girl aged 11 years suffers from mild afebrile chorea. She has no symptoms other than typical clumsy purposeless movements, and no signs of infection. In view of the mild course and the absence of any sign of cardiac involvement, is there any justification for insisting on rest in bed? Should salicylates or other drug be prescribed?*

A.—Patients with Sydenham's chorea fall into one of two clinical groups; in the first, chorea is accompanied by fever and tachycardia, evidence of active heart disease, perhaps arthritis, and certainly an elevated erythrocyte sedimentation rate; in the second group chorea is the only symptom, there are no signs of heart disease or evidence of active infection, and, in particular, the erythrocyte sedimentation rate is normal. In this second type, to which the questioner's patient seems to belong, there is no need for drugs other than sedatives. Rest in bed for three or four weeks is advisable in most patients, particularly when movements are vigorous. There is, however, no evidence that supervised activity prolongs the disease, and in the absence of other clinical or laboratory evidence of active rheumatic infection no harm comes of allowing the mildly choreic patient to be out of bed.

NOTES AND COMMENTS

Temperature at Ovulation.—Mrs. S. C. R. ROBINSON, Secretary of the Family Planning Association, 69, Eccleston Square, London, S.W.1, writes: Increasing numbers of practitioners are using monthly temperature readings in order to locate ovulation dates in gynaecological cases. It is laborious to explain the technique to patients, and the Medical Subcommittee of this Association has drawn up a printed temperature chart and instructions, which is used in some hospital out-patient departments and in private work. Possibly other practitioners might be glad to order copies from this office.

Post-gastrectomy Diet.—Dr. JOHN R. GILLESPIE (Belfast) writes: Under "Any Questions?" (May 28, p. 967) there is a serious omission in the answer given to the question about diet after partial gastrectomy. The concluding sentence says, "There is no general indication for medicines, but in some instances a vitamin concentrate and iron may be advisable." Now, before the operation the patient probably had excess of hydrochloric acid secretion. But after the operation he probably has a serious deficiency, or even total absence, of this secretion; and this deficiency should be met by prescribing a suitable dose of dilute hydrochloric acid, to be taken in a glass of water after at least one meal a day. Otherwise the patient is likely to develop severe anaemia.

Vaccine Lymph.—Dr. B. J. PECK (Plymouth) writes: With reference to the recent correspondence in the *Journal* on the expulsion of vaccine lymph from tubes, perhaps the following method will satisfy both those who feel that an attempt at asepsis should be made and those who are more lax. The apparatus consists of the rubber bulb of an ordinary eye-dropper, with the outlet narrowed down by the insertion of a small rubber bung which has had a longitudinal hole of about 1 mm. diameter bored through it and which is kept in place with a little rubber solution. (I understand that this is not an original idea, and one or two firms market a "vaccine-expeller" of much the same design.) The vaccine tube is inserted into the hole in the bung, and when required the lymph can be deposited on the skin by breaking off the exposed end of the tube and squeezing the bulb.

Pediculosis Pubis.—Dr. G. F. MAGURRAN (Exeter) writes: Your answer to the question of the most effective treatment of pediculosis pubis ("Any Questions?" May 21, p. 920) is to my mind very incomplete. I would beg to make the following observations: (1) The pediculi cling like limpets to the skin, and I do not believe that mere shaving and washing can be effective. (2) The nits and pediculi frequently spread not only over the pubic region but over the lower abdomen, all around the upper third of the thighs and the buttocks, and consequently are missed by treatment. (3) Surely clothing should be fumigated? (4) In a case of reinfestation in spite of adequate treatment there are probably other cases in the house. (5) I found during the war that two applications of benzyl benzoate emulsion, without shaving, were simple, clean, and adequate.

Pruritus.—Miss G. THOMPSON (Richmond, Surrey) writes: The article on the mind and the skin by Dr. I. B. Sneddon (March 19, p. 472) contains no reference to the work of O. H. Horrall (*Bile—Its Toxicity and Relation to Disease*, Chicago), who came to the following conclusions: (1) That pruritus is associated with a disturbed liver function; (2) that even a slight pressure on the biliary duct causes obstruction; (3) that in certain cases of persistent itching without jaundice there is a decreased ability of the liver to excrete phenoltetrachlorphthalein; (4) that a chronic case of pruritus cleared completely when bile salts were injected; (5) that drainage of the gall-bladder often gives complete relief; (6) that the most efficient treatment is to get rid of the icterus. Unless these points are borne in mind considerable injustice to some sufferers from pruritus will occur.

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 2111. TELEGRAMS: *Aitiology, Westcent, London.* ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone, unless the contrary be stated.

Authors desiring REPRINTS should communicate with the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors overseas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

ADVERTISEMENTS should be addressed to the Advertisement Manager, B.M.A. House, Tavistock Square, London, W.C.1 (hours 9 a.m. to 5 p.m.). TELEPHONE: EUSTON 2111. TELEGRAMS: *Britmedads, Westcent, London.*

MEMBERS' SUBSCRIPTIONS should be sent to the SECRETARY of the Association. TELEPHONE: EUSTON 2111. TELEGRAMS: *Medisecra, Westcent, London.*

B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.